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# Railway Age

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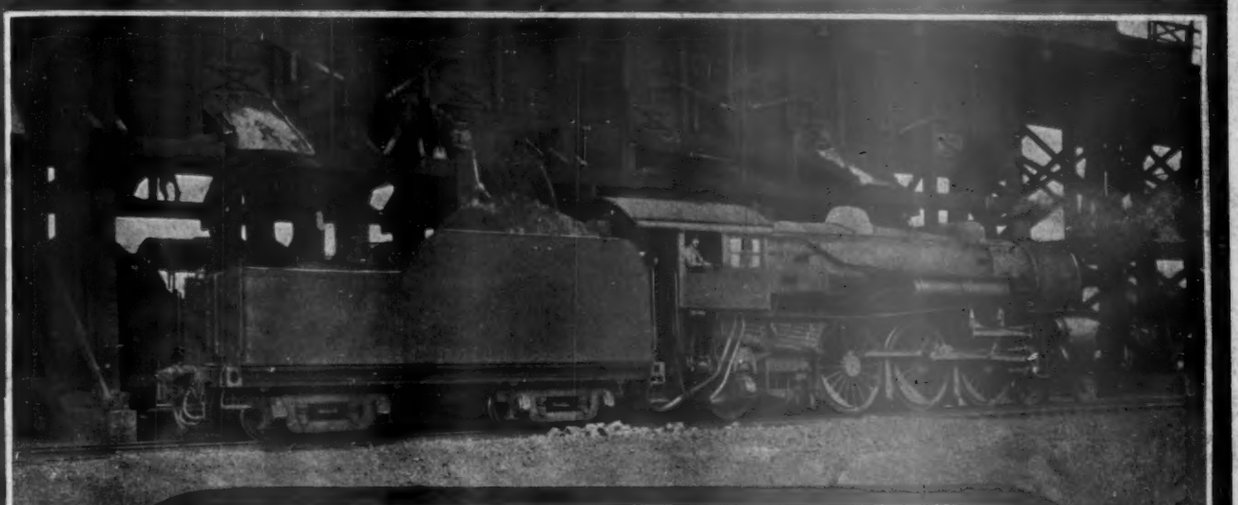

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*Quoted before the recent Traveling Engineers Convention as representative of current conditions.

## Security Sectional Arch

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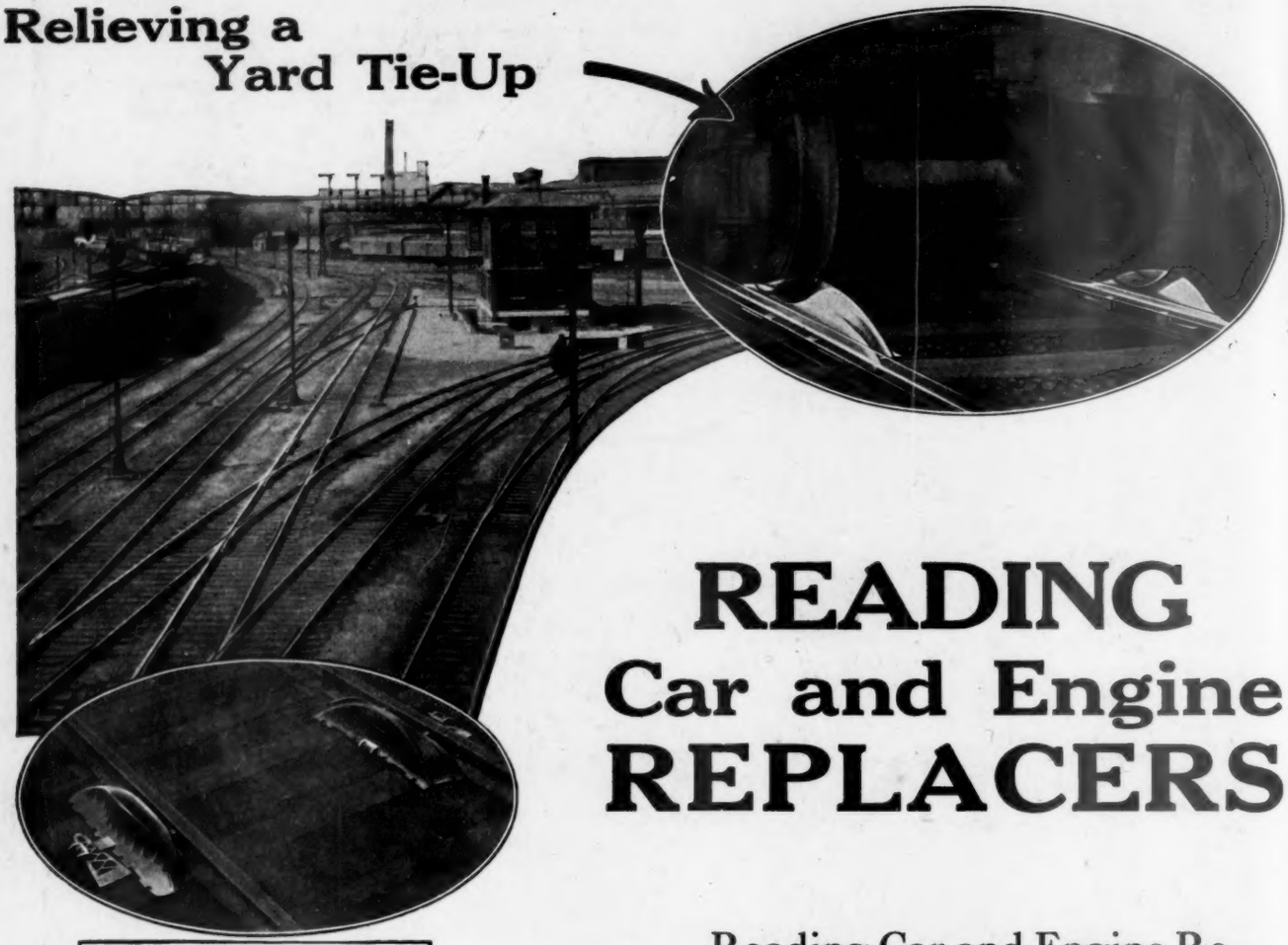
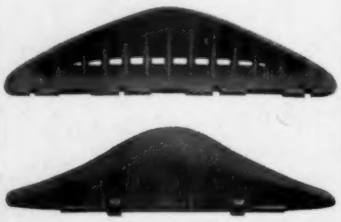
## Relieving a Yard Tie-Up



# READING
## Car and Engine
# REPLACERS

VIEWS of INSIDE REPLACER



VIEWS of OUTSIDE REPLACER

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# EDITORIAL

Railway Age

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## Reprint of Annual Statistical Number

ALTHOUGH we printed several thousand extra copies of the Annual Review Number of the *Railway Age* (January 6, 1923), the demands for extra copies have been so great that the edition has been exhausted and we are preparing to make a reprint of the entire number. Those who desire additional copies should wire in orders immediately.

## Indexes to Volume 73

THE INDEXES to the last volume of the *Railway Age* are now ready for distribution. Those desiring indexes to this volume should kindly advise the New York office, 2201 Woolworth Building.

### What of Future Conditions?

Increased operating requirements have effected a gradual refinement of railway location. It is a long time since the curve easement was first considered essential to good riding track and still longer since the compensation of grades for curvature was recognized as a prime requirement. Other improvements in location practices as applied to either new lines or grade revision are directly related to the requirements of the heavy train loads of modern railroading. Thus, the flattening of the grade at passing tracks, water stations or other points where trains stop, has come to assume importance. On a passing track this flattening may be carried out for its entire length or it may be restricted to those points in the length of the track or beyond its ends where ascending trains normally stop—practices differ. But whatever method is followed, care should be exercised to insure that the gradient adopted is not committed too definitely to the present standard of passing track length as subsequent changes in power or operating conditions may result in an increase in the train load such as to require a greater length of passing tracks than that which was in vogue when the grade line was established.

### Open a Conversation with a Shipper

"The people should be again assured that we are bending all our energies to give them good service." This is one of the points in the December circular to employees issued by W. A. Winburn, president of the Central of Georgia. Mr. Winburn speaks of the friendly co-operation of shippers and passengers during the difficulties incident to the shopmen's strike, and of the fact that the car shortage of the past two months has again taxed the patience of the road's patrons. This injunction to his spokesmen once more calls attention to the fact that local agents, with their helpers, conductors and their assistants, constitute the vital medium of communication between a railroad and its customers. And to some of these men, the duty here enjoined will be slightly novel; it will disturb that habit of mind in which a man is always on the defensive. An agent or a conductor will, indeed, be far above the average if he is always alert, intelligent, and successful in defending his company when it is criticized or attacked or its service complained of; but here is a call to go a bit farther. Do not wait for the patron to complain; open the subject yourself; tell him your attitude without waiting to be asked. How many of your men, Mr. Superintendent, will take high rank in this branch of their work? How high do you stand, yourself?

### A New Bridge at Niagara

Niagara Falls and the gorge which carries away the waters from its foot is a national institution. Therefore, any engineering projects in any way relating thereto arouse interest that is not confined to the engineer. The plans of the Michigan Central for a new arch bridge to cross the gorge near the site of the well-known cantilever structure will be reviewed with interest by all railway officers. One feature of the proposed structure stands out in sharp contrast to the corresponding details of its predecessor. The studies for the new arch have been based on most careful and detailed investigation of the geology of the gorge as a means of insuring that the thrust from the arch haunches will be resisted by foundations bearing on solid rock. As described in the article appearing on another page of this issue, no such security was obtained in the older bridge which is supported on the natural riprap which overlies the two faces of the rock cleft. That the decision to build the old bridge on this foundation was not ill-advised is demonstrated by its long useful life. However, modern practice in bridge design with the means available for more economical construction has passed the stage when such practice was considered legitimate, even where the special requirements of an arch may be left out of consideration.

### Net Operating Income in November

The net operating income earned by the railways in November, which has just been reported, should cause mild optimism regarding the net return of the months immediately ahead. It amounted to $78,860,500, or at the annual rate of 4.46 per cent on the tentative valuation made by the Interstate Commerce Commission. While this is not a result to become jubilant over, it is an improvement over the results of recent months. The return earned in August was at the rate of only 2.65, in September only 2.88, and in October only 4.05 per cent. The most encouraging thing about the net operating income of November is that it shows an increase over that of November, 1921, whereas the net return earned in the immediately preceding three months showed reductions as compared with last year. Although the freight moved in November was the largest for that month in history,

the net return earned was less than the average earned in November in the three "test years" upon which the standard return guaranteed under government control was based. The November average in the test years was $83,536,000. On the other hand, however, the net return earned in November, 1922, was the largest for this month since 1917. The net returns earned in this month in the five preceding years were as follows: 1917, $76,764,748; 1918, $57,270,158; 1919, $22,025,807; 1920, $54,343,793; 1921, $66,884,000. The railways are still suffering from abnormal expenses due to the effects of the shop employees' strike, and to the high price of coal. In spite of the reduction of wages on July 1, their operating expenses in November, 1922, were $41,000,000 more than in 1921. Total earnings, however, owing to the unprecedented freight business, were almost $113,500,000 larger. The figures indicate that if traffic continues to move in large volume, as it promises to do, and unwarranted reductions of rates can be prevented, the railways will slowly but surely work back to a normal basis of earnings, expenses and net return.

**The Uneconomical Night Station Agent**

Station employees on duty all night often have rather light duties—a condition which may not be without elements of reasonableness; but the executive who has the duty of showing productive service for every dollar that he expends by way of the payroll sometimes thinks that these situations put him in very bad luck. A small junction may require a ticket seller, a baggageman, a yardmaster and a weighmaster throughout the night, though each of these men in ordinary times may each night perform no more useful work than he could do in two hours. Are there practical ways in which some of these men's time may be better utilized? A correspondent on a Southwestern road, who has had some experience, says that there is; but he does not give us any particulars. The most instructive word on the subject that has come to our attention is that of a junction agent who said that he had done some economizing but that (1) he had to fight objectors—mild or otherwise—on three sides, and (2) that if he were to try to describe his process so as to make it apply at any other station than his own, he would need the assistance of an A. R. A. committee; that is to say, the describing process would call for much patience and skill. Which means that each station is largely a law unto itself. An alert and ambitious ticket clerk can do much useful work between trains; but if the clerk's ambition is yet to be developed, it is necessary to lay out some work for him. Some kind of clerical work can usually be found. With men other than ticket sellers much preliminary education would be required. Many stations seem to be afflicted with employees of the character of the hotel cook, who was cordially willing to help out in any emergency, but unfortunately had had experience in only one line—putting the meringue on to the pies!

**A Collision Due to One Illegible Figure?**

The occurrence of a fatal collision on a railroad not operated under the space-interval system conveys one simple lesson—that the block system is needed. This has been preached in these columns for many years. But collisions continue to occur on lines of that character; the Interstate Commerce Commission has just reported five of them, in which ten persons were killed and 43 injured. There is no sign that any change of system is proposed, and the public therefore may very fairly inquire what is being done to improve the existing system (assuming that the public is not going to exercise its prerogative, as defined in Section 26 of the Interstate Commerce Act, to require the use of the block system everywhere). With this in view we have abstracted on another page the report of the commission on a collision at Denver, Indiana, on the Lake Erie & Western, where an innocent engineman was killed. In this case, two or three written rules were ignored—and twice that number, including written and unwritten. (1) The conductor and engineman should have demanded a copy of the train order unmistakably legible; to feel sure in their minds that 5:20 was the correct hour was not enough; they ought to have had evidence on paper. (2) The operator was bound to write clearly. An ambiguous figure or letter is as dangerous as any other error. (3) The operator should have listened to the other operator's repetition. (4) The operator should have delivered copies only after he knew that he had one for his own file. (5) He should never make a copy from memory. (6) The superintendent should have forbidden the use of figures without words. Some operating officers would add a seventh point: Make meeting points positive as to place, putting no dependence on time. A review of the circumstances suggests an eighth: That the question of the moral character of operators (and others)—how readily they will prevaricate when self-interest is thought to demand it—calls for action on the part of employing officers. But the more we explore the ramifications of this problem the greater the confusion; and the more clearly appears the reason why we should end where we began: adopt the block system.

**American Practice Abroad**

According to the statements of a number of our contributors in the foreign section of our Annual Review Number, issued last week, there is a definite tendency in many countries for the railways to devote increasing attention to developing those features in which American railways have long excelled, viz., liberal clearances, heavier equipment and heavier train loading. Our correspondent in India says that "the general tendency nowadays is to follow American methods rather than English." In Australia and South Africa the same leanings are evident. Even in certain parts of Europe the movement for larger cars and heavier train loads is gaining in strength. American railway men who have been responsible for this country's leadership in development along these lines may well take pride in their accomplishment. At the same time, any one who reads carefully the review of railway conditions throughout the world as given in our Annual Review Number cannot escape the conclusion that many countries have been more successful in meeting some of the railways' problems than have the railways in this country. The fact that wage reductions were brought about in most countries with but a small fraction of the discord and trouble which they caused here is a notable example. In the handling of passenger traffic our roads, which are primarily, of course, freight carriers, could doubtless learn a great deal from some of the European railways. Railway officers from all over the world come to America and Canada to study our railways and most of them return home with valuable ideas. Many railway officers from this country, it is true, go abroad for the same purpose but, it must be admitted, not in the same numbers as railway visitors come to this country. Railway men from all parts of the world can benefit to the same extent from studying each others' methods as can railway men from various parts of the United States and Canada. Especially desirable is a closer rapprochement between railway men in the English-speaking countries, because with them the exchange of ideas is facilitated by the similarity of language. Many railroad men from Great Britain and from the British dominions in the southern hemisphere come to this continent each year to study our methods. Would it not be to the advantage of Americans and Canadians to return these visits?

**Electric Motor Standardization**

Standards for electric motors used for all purposes by the railroads have recently been developed by the Association of Railway Electrical Engineers and attention has been called to the value and need for such specifications by the action of the International Technical Commission at Geneva, Switzerland. This commission, comprised of 58 delegates representing 12 countries prominent in the electrical industry, has more recently adopted standards for electric motors which are practically identical with those developed by the A.R.E.E. Such motor specifications are required because of the inherent necessity for railroad operating organizations to be divided and sub-divided into major and sub-departments. It is this fact that primarily forces railroads to use more substantial and rugged motors for the various services for which they are employed, than those which are used in ordinary industrial service. The purpose of the A.R.E.E. specifications is to guide the purchaser in the selection of and the manufacturer in the furnishing of electric motors for steam railroad service. Motors used by railroads are operated and maintained under conditions peculiar to that service and motors with a given rating, as offered to the railroads by the various motor manufacturers, differ widely in quality and design. The specifications as developed deal only with open type motors, but will later be enlarged to include also the semi-enclosed and fully-enclosed types. They were presented at the semi-annual convention of the A.R.E.E. held in Chicago in November and will be published in the proceedings of that Association. The Electric Power Club and a number of motor manufacturers attended three open meetings of the committee during the preparation of the specifications. In speaking of the A.R.E.E. specifications a prominent manufacturer recently stated, "It is indeed a curious thing that the A.R.E.E. committee should have hit on a particular definition which the electrical industry of this country failed to crystallize and which now bids fair to become not only a standard in this country, but one of international scope."

**Better Annual Reports**

There are still many railroad annual reports that devote their first paragraph, or first page, to the details of the changes in the operated mileage of the company. In such reports there may be set forth in most explicit detail the facts that the operated mileage increased during the year through the addition of 1.3 miles of branch lines and that there was a reduction of 0.17 miles due to a resurvey and that there was abandoned for operation 1.33 miles, resulting in a net decrease in the company's mileage of 0.2 during the year covered by the report. It is rather difficult to imagine anything in the railroad's affairs that might be of less importance to the stockholder or other person who is called upon to use the annual report than a net change of 0.2 miles or some other such figure in the company's mileage. This seems to be argument enough that it is not quite the proper thing to start the report with the changes in mileage. It would be better to put first, as so many roads do, the statement of net income which, above all things, is the detail which the student of the annual report wants to see first. The point, however, is not that the report may not be arranged properly. The interesting feature is rather the attitude towards the annual report and the idea that may be in the back of the head of the person who prepares the report as to what the stockholder, bondholder or investor in general may want to know about the property. Annual reports have been issued for many, many years. In earlier years they were prepared more as a necessary record rather than because of a realization of the desirability of informing the reader adequately as to the railroad's operations. In recent years there has been a tendency towards a realization of the value and the necessity of keeping the stockholder as fully informed as possible of the railroad situation as a whole and the situation on the railroad issuing the annual report in particular. The annual reports issued by the various railroads show widely varying degrees of the amount of this realization. There are a large number, however, from which it is extremely difficult to glean any adequate idea concerning what the railroad may have done in the period which the report covers. This sort of a report is behind the times; the railroad that issues it is not showing that it has an adequate idea of the new attitude which public utilities in general are taking concerning the rights of the stockholders to be informed completely and adequately.

# Wasted Information

CAPPER'S WEEKLY, published by Arthur Capper, a United States senator from Kansas, has recently come out with an "Eastern Edition," published at Washington, D. C. We are not advised as to the extent to which Senator Capper gives his personal attention to this one of his various enterprises for "farming the farmer," but the first issue, that for January 6, of the Washington edition suggests that if it had made use of the senator as a reporter its readers might have been more accurately informed on a matter of some interest and importance.

In his capacity as senator, Mr. Capper recently had the Senate adopt a resolution calling upon the Interstate Commerce Commission to furnish a considerable amount of detailed information as to the progress made in administering the provision of the Transportation Act which requires the railroad systems to pay to the government one-half of any net railway operating income above six per cent on their value as determined by the commission. Senator Capper has been rather careless in his gathering or use of some of the alleged facts about the railroads that he has presented in speeches in the Senate and elsewhere of late, but on this occasion he displayed a commendable desire to go to the proper source for information, although the main facts about the matter had been explained in the annual report of the Interstate Commerce Commission submitted to Congress the day before he introduced the resolution. The senator had previously indicated that he expected the report of the commission in response to his resolution to show that a considerable number of railroads had earned large sums in excess of a six per cent return and that they were illegally withholding the government's share.

On December 30 the commission submitted a report to the Senate showing that it had not yet completed the valuation of any road up to the period covered by the law and therefore was not in a position to say definitely whether or not any system had earned over six per cent, but that it is now engaged in bringing up to date the valuations of some 40 carriers whose returns *indicate* that they *may be* subject to the recapture provision of Section 15-a for 1920 and 1921. It also reported that three small Class I railroads had reported excess earnings amounting to less than $200,000, but no Class I railroad had paid any excess earnings to the commission, and that 26 other than Class I railroads had reported excess earnings, and nine of them had paid to the commission approximately $42,000 as representing half of the excess. The commission also reported some 12 Class I railroads, not including any of the larger systems, whose earnings were computed as about $15,000,000 in excess of six per cent on the amount of the tentative valuations already made by the commission, dating back from four to eight years, although the railroads had not reported any excess on the basis of the values which they claimed for 1920 and

1921, which are naturally larger than the tentative valuations by reason of the additions of several years as well as by reason of the elements which the roads claim which the commission has not yet allowed. This made a total of about 40 roads as to which it might be said that there are indications that they may owe the government some money, out of what they were able to save on rates which yielded the roads as a whole a return of about four per cent, although the commission has not yet made any definite demand on any of the roads for any amount.

Although the commission had gone to some pains to satisfy the curiosity of the publisher of Capper's Weekly, the senator from Kansas apparently failed to co-operate with the editors of his paper in seeing that they were advised of the contents of the report, for its issue of January 6 carried on its first page a story, the character of which is indicated by the large headline, "Roads Make Big Gain in Profit," followed by a subheading: "Capper Resolution in Senate Brings Out Fact That 40 Roads Made More Than Six Per Cent Standard Set in Transportation Act. Have Paid None of Excess to Government and Will Fight Payment. Facts Prove Argument for Lower Rates for Farmer." There was no statement of the amount of the alleged excess, nor of the fact that it was merely "indicated" and could not be determined until the valuations were made. Of course, we are not informed as to the process followed by Capper's Weekly in obtaining this misinformation on a subject in which its publisher has shown such a keen interest, but the striking similarity between its story and statements contained in a brief and carelessly written press association dispatch published in many papers of December 31 suggests that Capper's Weekly used that as the basis without taking the trouble to read the commission's report.

However, on January 5, after the issue of his paper dated January 6 had been mailed, Senator Capper obtained from the Senate an order to have the commission's report printed as a Senate document so that he may yet get around to reading it in the more convenient form and the necessary corrections of the erroneous statements published in Capper's Weekly may be hoped for in due time.

While it is undoubtedly to be expected that many railroads will endeavor to contest the law the stage of its enforcement has not yet been reached because of the absence of the necessary figures and in the meantime there is no sense in muddying the waters.

## More Work for 1923

IN OUR ISSUE of last week we presented a compilation of the budget appropriations of 27 railways with an aggregate mileage of approximately 95,000, showing that they have already definitely appropriated over $350,000,000 for improvements to roadway and structures during 1923. Since that compilation went to press similar information has been received from four additional roads. These lines, with a combined mileage of 8,200, will spend over $37,000,000, making the total appropriations for the 31 roads, with approximately 40 per cent of the mileage of the United States, aggregate over $387,000,000.

Among the roads from which information has just been received is the Chesapeake & Ohio, whose budget includes approximately $12,000,000 for roadway improvements, including $3,658,000 for a new steel coal pier at Newport News, Va.; $3,633,000 for additional storage and yard tracks, and $2,652,000 for passing sidings and extensions of existing sidings. In addition 58 locomotives, 5,620 freight cars and 68 passenger cars, involving a total expenditure of $14,591,000 were ordered during 1922 for delivery during the present year.

The Delaware & Hudson has appropriated $62,282 for shop tools, $99,000 for interlocking plants, and $88,000 for one new locomotive, in addition to approximately $190,000 for roadway improvements now under way.

The Long Island's budget will aggregate over $5,000,000. It has set aside $1,200,000 for the elimination of grade crossings; $400,000 for the construction of four miles of second track, and approximately $800,000 for new terminal facilities. It has also appropriated $345,000 for signals and interlocking and $200,000 for increased electric power facilities, while it has set aside $2,500,000 for the purchase of 8 locomotives and 100 passenger cars.

The Minneapolis, St. Paul & Sault Ste. Marie will also spend over $5,000,000, nearly $3,000,000 of which will go for new equipment. Eleven miles of second track will be built at an approximate cost of $640,000, while one-half million dollars will be spent for grade reduction, $50,000 will be spent for new shop tools, and $900,000 for miscellaneous roadway improvements.

This additional information further substantiates the statement that 1923 gives promise of being one of the most active years the railways have had in the last decade. The continuance of heavy traffic points with increasing force to the inadequacy of facilities at many points, while the improvement in earnings justifies the managements in authorizing capital expenditures. There are therefore more grounds for optimism among railway and railway supply companies now than at this period for many years. There is also the necessity for engineering and other officers to plan to undertake these improvements at the earliest possible date in order that they may be completed as far as possible during the next season and so that a return may be secured from the investment as soon as possible.

## "Fancy Salaries"

SENATOR LAFOLLETTE of Wisconsin, who hates the railways as the devil is said to hate holy water, has unintentionally done them a good turn. He has caused to be published in a report of hearings before the Senate Committee on Interstate Commerce a list of the salaries of all railway officers who were receiving at the rate of more than $5,000 a year in 1921. By so doing he has called attention to two things: First, that the number of so-called "fancy" salaries paid in the railroad business is much smaller than demagogues and labor agitators have led railway employees and the public to believe; secondly, that the door of opportunity in the railroad business still stands wide open to every man who enters the service.

It has sometimes been charged that nepotism prevails on railroads and that important positions and high salaries are gained by "pull." There has been a good deal of discussion within recent years as to whether a young man who enters the service at the bottom without "pull" has as good an opportunity as formerly to have a successful career. The best answer that can be made to the questions raised is to give a list of the men who are shown by the Senate Committee's report to be receiving $50,000 or more per year and some facts about their careers.

There were 25 men receiving such salaries in 1921. Of these, 17 entered railroad service before they were 21 years old, and almost all began their railway careers as workers in the ranks. The following list gives the names of the men receiving salaries of $50,000 or more, positions they first held and their ages when they entered the railway service:

| | | |
|---|---|---|
| C. R. Gray | Telegraph Operator | 15 years old |
| C. H. Markham | Track Laborer | 20 years old |
| H. E. Byram | Call Boy | 16 years old |
| J. E. Gorham | Office Boy | 14 years old |
| C. E. Schaff | Brakeman | 15 years old |
| E. Pennington | Warehouseman | 21 years old |
| J. Kruttschnitt | Engineer on Construction | 24 years old |
| R. S. Lovett | Local Attorney | 24 years old |
| Daniel Willard | Track Laborer | 18 years old |
| W. T. Noonan | Office Boy | 14 years old |
| N. D. Maher | Surveyor's Clerk | 17 years old |
| Hale Holden | Attorney | 38 years old |
| T. M. Schumacher | Telegraph Operator | 17 years old |
| L. F. Loree | Assistant, Eng. Corps | 19 years old |
| S. M. Felton | Rodman | 15 years old |
| E. J. Pearson | Rodman | 18 years old |
| W. B. Storey | Axman, Engineer Corps | 20 years old |
| B. F. Bush | Rodman | 22 years old |
| Howard Elliott | Rodman | 22 years old |
| Samuel Rea | Engineer Corps | 16 years old |
| E. N. Brown | Rodman | 16 years old |
| A. T. Dice | Flagman, Engineer Corps | 19 years old |
| Charles Donnelly | Attorney | 34 years old |
| A. H. Smith | Messenger | |
| William Sproule | Freight Clerk | |

We do not know the ages at which A. H. Smith and William Sproule entered railway service, but they must have been very young as Mr. Smith began work as a messenger in 1879 and Mr. Sproule as a freight clerk in 1882. The only two men in the list who entered railway service when they were over 30 years old were Hale Holden and Charles Donnelly, and they both rose through the law department.

These facts indicate that some romantic stories could be written about the careers of some of these men. Take, for example, the case of a man who entered railway service as a messenger when 14 years old, and when only 36 was a railroad president. This is the story of W. T. Noonan. Hale Holden was a lawyer in general practice until he was 38 years old. He then became a railroad attorney, and when only 45 years old was president of one of the largest systems in the country.

There has been much discussion within the last few years in the *Railway Age* and elsewhere regarding the opportunity afforded college graduates in the railroad business. A partial answer is given to this question when it is stated that ten out of the 25 men whose names are given in the above list are college men. Those who went to college are Messrs. Kruttschnitt, Holden, Loree, Felton, Pearson, Storey, Bush, Elliott, Donnelly and Brown, and seven took engineering courses. It may be asked how some of them could have gone to college and entered railway service at such early ages. The answer is that several did work for railways in vacations and at other times to earn money with which to pay their college expenses. The fact that ten of the 26 highest paid men in the railroad business are college men certainly shows that a college education is a help to success in the railroad business.

If, however, the young man, whether a college man or not, who enters the railroad business expects to rise to a presidency while still young, the experience of these men shows that he is likely to be disappointed. The record shows that most of them were around 50 years of age when they became presidents. Of the 23 men receiving salaries of $50,000 or more whose ages can be given, ten were under 50 and thirteen were over 50 when they became railroad presidents. Their average age was 52 years, and the average length of time they had been in service was over 31 years.

Since those who are now receiving these large salaries were an average of 52 years old and had spent an average of 31 years in railroad service before they began to receive them, it is evident that even though a man rises to the highest official rank in the railroad business he usually cannot hope to receive a large salary many years. Furthermore, he will not be allowed to keep anywhere near all of it. Most people with small incomes do not realize how heavy is the income tax on large incomes. The income tax on an income of $50,000 is about $9,000. Therefore, after paying his income tax, a man with a salary of $50,000 has about $41,000 left. The income tax on an income of $75,000 is about $17,000, and therefore the recipient after paying his income tax has about $58,000 left. If a man has ability enough to manage a large railroad system should he not be allowed to accumulate a competency? Their salaries are practically all the incomes that most railway officers have, and it is evident that a man who does not become president of a railroad until he is about 50 years old and whose income, after paying his income tax, is only from $41,000 to $58,000 a year, is not likely to grow very rich.

But, it is charged, these so-called "fancy salaries" tend to cause high rates and to prevent labor from being paid reasonable wages. All the salaries of $50,000 or more given in the list published in the Senate committee's report aggregate $1,602,068 a year. This was one dollar out of each $3,443 that the railways earned in 1921. It took about two and a half hours' railway earnings to pay these "fancy salaries." If all the men who receive salaries of $50,000 or more had worked for nothing in 1921 and the amount paid to them had been added to the wages of the employees, this would have added less than one dollar a year to the wage of each employee, or 3⅓ cents for each working day!

The large salaries paid in the railroad business amount to so little in the aggregate that if none of them was paid and all other things remained equal, hardly the most infinitesimal effect would be produced upon rates or wages. As a matter of fact, if large salaries in the railway business were abolished the effect in the long run probably would be to increase the rates that would have to be charged and to reduce the wages that could be paid. These high salaries are the only big prizes the railways have to offer for energy, ambition and ability. They are the prizes for which the most ambitious, energetic and able men in the business compete and for which they compete by doing their work with all the energy and ability of which they are capable. To remove these prizes from the business would be largely to destroy the incentive of able men to stay in it and put forth their best efforts. It is doubtful if there are any large incomes earned in America from whose payment the public derives indirectly as much benefit or the abolition of which would cost the public as much.

# New Books

*Manual of Recommended Practice of the American Wood Preservers' Association. 133 pages, illustrated. 4½ in. x 7 in. Bound in leather. Published by the Association, S. D. Cooper, Secretary, A. T. & S. F. Ry., Topeka, Kan.*

This manual is not intended as a complete text book or treatise on the subject of wood preservation, but it is designed as a guide for architects, contractors, engineers and others who have occasion to use wood where it is subjected to attack by marine borers, fungus, or insects. The volume includes the standards adopted by the American Wood Preservers' Association, together with much additional tabular and other information of value to those treating and using wood. It is prepared in loose leaf form so that additions can be made readily. Among the standards contained are those for creosote oil, zinc chloride, specifications for interior wood block floors and for creosoted wood block paving, and standard definitions of processes and standards for the purchase and preservation of treatable timber.

# Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

## Common Sense Applied to the Labor Problem

GREENVILLE, TEX.

TO THE EDITOR:

In looking over the latest Railway Official Guide, I ran across the names of several railway men I knew personally some years ago, and a few others since then that I have watched come up the line, because of having worked with them or for them.

Some of these men are on the top rung of the ladder of success, while the others, who are younger in the game, are steadily climbing. There are three that I have always been very much interested in, for we were boys together. At one time I worked as dispatcher with all three of them; one is now president of an eastern road, another is vice-president of a western road, and the other is manager of a large railway that runs both east and west of the Mississippi river. The reason I single out these men is because the roads they are with have not as yet settled with their men in the strike of the shop crafts and I do not believe they are going to. I have heard so many unkind remarks about the cold-blooded, heartless managers, that I am forced to take the part of these three friends of mine.

When I was associated with them, they never failed to help a "boomer" railway man on his way, giving him money, meals or clothes; others they shielded by not reporting a mistake they had made, and I positively know these men would not knowingly cause any one suffering or hardship. I have known these men to borrow in order to give to others.

These officers are all self-made men, having started at the very bottom as call boy, messenger or night clerk. They were not more gifted, nor had they any better chance than the rest; neither did they have the pull so many that advance are accused of having—yet they left many of their fellow workers standing still as if they were hitched to a post. There was one very noticeable thing they did have, and that was nerve to do things when emergencies arose—they were not afraid to take action. If they were wrong they profited by their mistake—if right, they were encouraged by the complimentary remarks of their superior officer.

I have been railroading 41 years and can say from personal experience that I never was refused anything by my superior officer when I went after it personally, while on the other hand, when it was left to an outsider to settle, I was refused. The trouble, as I see it, is like the farmers' trouble—"the middle man." The railway man's trouble is "the middle man—the riding delegate."

I believe that if an old, well-liked employee, or for that matter a couple of them, could meet the managers face to face and discuss matters across the table, a great amount of trouble could be avoided and matters settled satisfactorily to both sides.

Often the grievance man, who is sent to try and settle a dispute, has a personality that arouses antagonism and such a man can get nowhere with a general manager, no matter how he may feel about the matter. Every one of us has experienced this at some time. I recall one instance when I was approached by such a character and asked to join an order. His personality to me was such that I could and would not do as he asked; however, I did join when one of my associates asked me to do so. I have often heard the remark, "I'd rather deal with the devil I know, than deal with the devil I do not know." It is probably that way with our general managers or presidents; they perhaps would a great deal rather deal with an old trusted employee, working for them, than listen to the smoothest tongued "griever" that ever lived.

If the workers are made of the right kind of stuff and their records show them to be men of character, I am sure managers would gladly listen to them and more readily settle with them than they would with an outsider. Good men work for all railways. These men do not belong to the boomer element—they want to stay and make homes. Now I think a selection could be made from a bunch of employees that could fittingly represent any organization or craft without taking the case to Chicago, Washington or some other distant city, where you can get only meager reports of what is going on and the very little that's doing costs the labor organizations a bunch of money.

The strike game is a curious one. It's a game where both sides lose. I have never yet been able to locate the winner in any strike, so what's the use?

Let us go the limit with our own officials before we even think of strikes.

P. CAIN,
Dispatcher, Missouri, Kansas & Texas.

## "The Fundamentals of Good Organization"

NEW HAVEN, CONN.

TO THE EDITOR:

The article by R. N. Begien in the *Railway Age* of December 30, 1922, on The Fundamentals of Good Organization, is very interesting throughout but he makes one statement which challenges criticism. He states that it is "conceded" that one executive can handle a staff of ten men, and that this ratio of one to ten can be carried through the whole organization. I doubt very much if in the case of the ordinary man—and Mr. Begien states specifically in the article that he is discussing what can be done towards organizing ordinary, and not brilliant, men—this will hold true.

When I was a roadmaster and had had six or eight years' experience on roads varying from light traffic in the south to heavy surburban and freight traffic in the north, I came to the conclusion that if a section foreman tried to handle more than eight men without a capable assistant foreman, he lost ground even if he personally was an able man. In later years I have often watched to see how this rule worked out in the higher grades. Again and again it has been evidenced to me that if an officer—and my observation included even some brilliant men—attempted or was forced to deal with more than this number on his staff, there was a lack of efficiency and that most of the permanently successful men dealt with even a smaller number.

Mr. Begien lays stress on the necessity of the personal touch which the executive should have with his subordinates in order to secure the greatest efficiency; apropos of this phase, I recall a conversation at a summer camp two or three years ago. A small group, which included a very successful teacher in a large eastern college, an ex-major in the army, a specialist in surgery making an income of probably $50,000 a year, and two or three others including the writer, was discussing methods of education. The teacher remarked that, as a result of his 20 or 30 years' experience, he felt that a teacher could not give what he should to the

pupil if there were more than eight in a class. This brought from me a confirmation from my own experience as stated above and the army man called attention to the infantry unit being the "squad" of eight men.

These independent views, developed in each case from long experience, indicate that to use ten as the normal ratio between one grade and the next, is too great. It will be interesting if views of others on this point are obtained. Even by using eight the six steps mentioned by Mr. Begien will still take care of over 30,000 employees, enough to man a large organization.

L. J. CARMALT.

## Honest Thinking and Honest Work

NEW YORK CITY.

TO THE EDITOR:

In the great multitude of voices which may be heard today in the railway world, in connection with the improvement of the friendly relations between employer and employee, one may easily find himself spending too much thought on details while yet he does not get down to the root of things. E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, who has had large experience as a railway operating officer, said one very significant thing in his address before the American Society of Mechanical Engineers in New York City on December 6 (*Railway Age*, December 9): the employer must not only deal honestly with his employees, he must *think* honestly. Here is a fundamental idea that may well be pondered. "Honesty is the best policy"; but, as has been well said, one who is honest for reasons of policy may not be really honest at all. An honest habit of mind is the essential. That is what produces real fairness in dealing.

In the past it has been deemed fair to tell employees that you were paying wages as high as could be afforded, while yet in your secret heart you meant if possible to earn a net return sufficient to pay dividends of six or seven or a higher per cent. That was not dishonest; but to the employee who believes that five per cent or less is a fair return to stockholders, your attitude *seemed* dishonest (after he saw the higher dividend actually paid). *That general condition still exists.*

There are many socialistic agitators today—not socialists, but benevolent minded persons who like to help the poor without cost to themselves—who convince the poor that they are not being fairly treated so long as the capitalist gets more than four or five per cent. And it is to be borne in mind that "the poor" are not simply the mass of ordinary laborers. Many enginemen, conductors and high grade clerks put themselves in this class *to the extent of thinking themselves abused by the capitalists.*

You are not going to make much headway toward a good understanding until you convince a *majority* of your employees that you are not too friendly to the capitalist. The great retail merchant who pleases the buying public by his low prices on extensive lines of goods, saves himself by making a very good profit on other lines, when the buyers are not watching him. That principle no longer holds good in the railroad field, and the fact must be faced. The people, through the government, have ordained that all of a railroad's inmost thoughts must be open to the inspection of everybody.

Even if you have to allow the capitalist more than is reasonable, you must still be honest and frank; tell the employee *why* you pay more than ought to be paid.

Mr. Herr mentioned another pregnant truth; the average employee misuses his spare time. The time which has been saved by changing from ten hours a day to eight is not wisely used. Some men put the two hours to good use; others do not. To say this is not to slam the "workingman," for many of us, in all classes, are deficient in the habits of thrift which are essential to a successful life. But, whatever the cause, the efficiency engineer, or any employing officer who aims at the best conditions (without calling himself an engineer) is bound to consider this fact.

As to the great majority of employees, the employer should enjoy the fruits of the whole of the individual's time, less what he needs for his family, his religion and his recreation. There has always been a percentage of men who, besides doing their full duty to the employer, have accumulated experience, wisdom and money and have got better jobs elsewhere. Of these, I am not speaking. The ordinary man, to whom in a sense the employer has made a gift of two hours a day, should be so led, or trained, or influenced that what the railroad has lost in quantity of service it shall have made up to it in quality of service. At any rate this is one of the elements of the theory on which reduction of hours of labor has been preached. The individual employee is told to improve his mind—and his soul—to an extent which would not have been possible under long working hours.

But, as Mr. Herr has said, there are many who do not act on this good advice. Will not the employer be doing a service to himself when he aids and guides his employees? Certainly, it is desirable that he—that is, the employer's officers, subordinate officers, foremen, etc.—that he should put himself on more friendly terms with them if possible; and what better way to do this than to co-operate—at least with the higher grades of employees—in social and educational activities? Those efforts in this direction which have been made public within the past year or two have been in the main highly commendable; but they have shown that unless the scheme is less strictly confined to the railroad field, and less exclusively to having a good time—mere recreation—the useful scope of such activities is likely to be rather narrow. Take the Young Men's Christian Association, for example. It is good to have big social gatherings, occasionally, and probably there ought to be more of these; but why not get into the more serious side of the Y. M. C. A. work; educational classes and other activities where those who participate have to do some real, productive work? It is good to play together; but better to work together. The most useful and interesting social or educative intercourse is that which is connected with something more serious than activities that are wholly recreational.

B. R. BLANCHARD.

## One Reason for Low Morale

WASHINGTON STATE

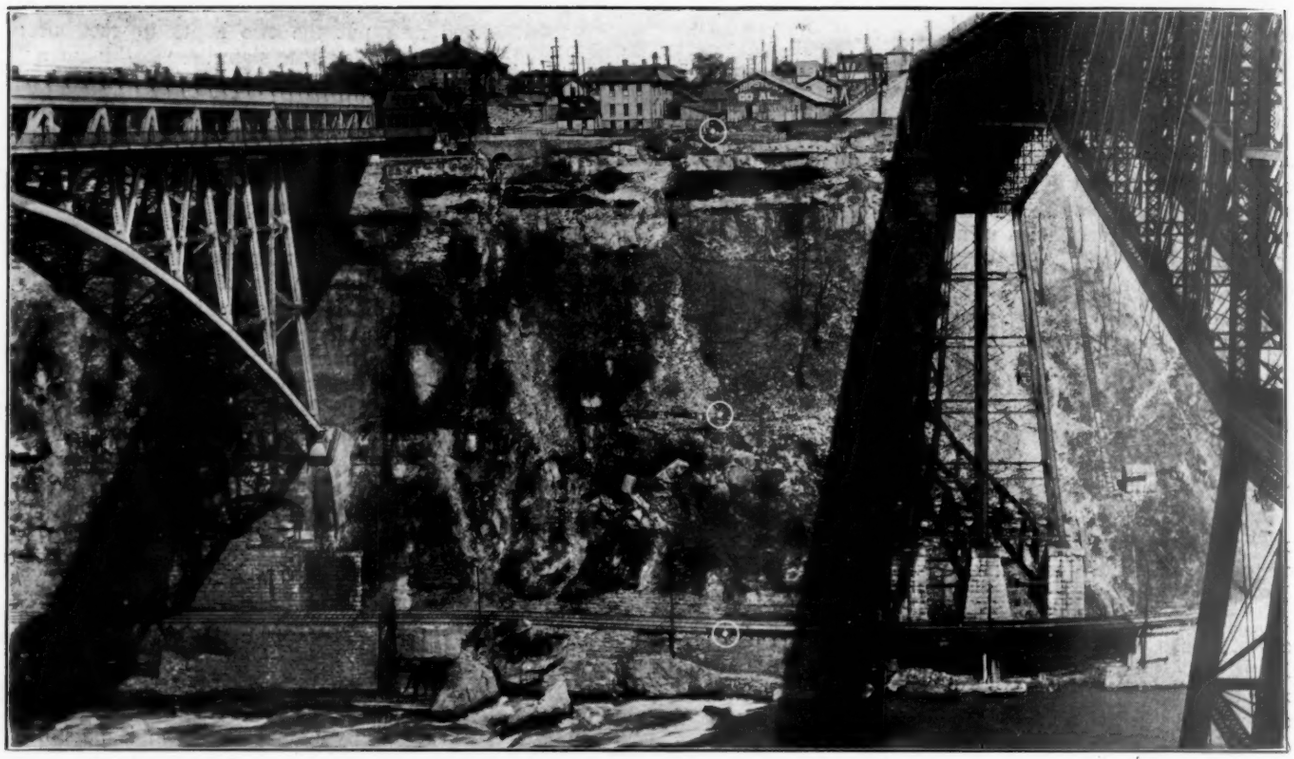
TO THE EDITOR:

I want to congratulate you upon the splendid work you are doing in bringing attention to bear on the distance that separates the managements and the men on most railroads, and the consequent misunderstandings.

By far the larger part of the men on almost all roads and a surprisingly large percentage of the junior officers as well, honestly believe that the managements are not chiefly concerned in the most efficient and economical possible operation of the properties, and the result is that only a very small part of the energy and driving power that is available is actually utilized. Of course, the efforts of those back of the Plumb plan are responsible in part, but I doubt whether they represent the largest factor.

It is to me the most serious phase of the railway question, and I think that you are doing a real service to the public in emphasizing it.

OPERATING OFFICER.



*The East Face of the Gorge. The White Circles Indicate the Center Lin e of the New Bridge*

# Michigan Central to Build New Bridge at Niagara

## A Second Arch Will Span the Rapids Gorge Between the Two Existing Railway Structures

THE MICHIGAN CENTRAL is now conducting negotiations with the various municipal and governmental authorities for the approval of plans for a new 640-ft. arch to replace the well-known cantilever bridge over the Niagara gorge. It is anticipated that actual construction will be undertaken as soon as these formalities are completed, the legal requirements being more than ordinarily complex in this case because the bridge is an international structure and its two ends lie within the limits of two municipalities, Niagara Falls, N. Y., and Niagara Falls, Ontario.

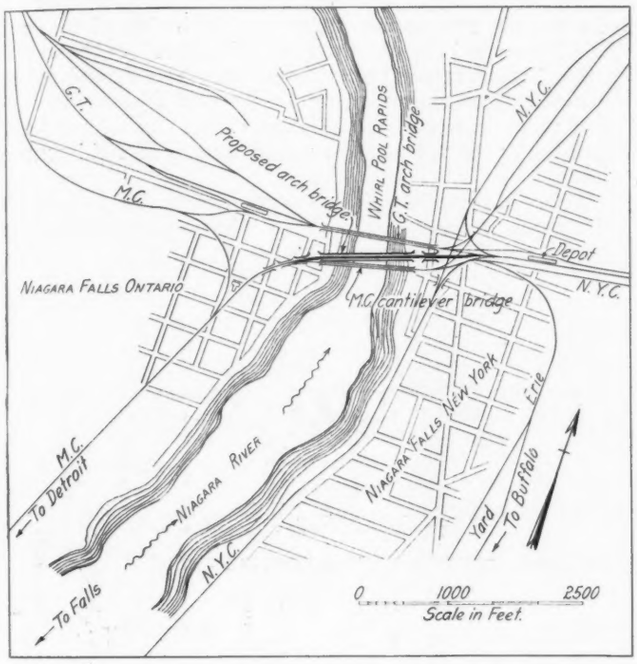
The proposed bridge will be the fifth structure to span the Niagara gorge at the head of the whirlpool rapids and will occupy a location between the present Michigan Central cantilever bridge and the 550-ft. arch bridge owned by the Niagara Suspension Bridge Company and the Niagara Falls International Bridge Company, but commonly known as the Grand Trunk arch. The history of bridges at this location affords opportunity for interesting study of bridge types. The first two, on the site of the Grand Trunk structure, were suspension bridges, the third is the Michigan Central cantilever, while the fourth and fifth, the Grand Trunk bridge and the new Michigan Central structure are arches.

The passing of the Michigan Central cantilever bridge which was built in 1883 to provide a direct connection with the New York Central represents but another of the oft-repeated instances of great bridges which have become obsolete in spite of measures taken to strengthen them for the continual increase in train loads. The bridge was designed by the late C. C. Schneider, for a live load on each track consisting of two 66-ton locomotives followed by a train load of 2,000 lb. per lineal ft. of track, this loading being equal practically to Cooper's E 23. In 1900, the bridge was strengthened by inserting center columns and center trusses, and this had the effect of increasing the loadings to E 35 for ordinary design stresses. With the speed across this bridge limited to 6 miles per hour, the structure is being utilized at the present time for loads approximately equal to E 45, but this is being accomplished only by ruling off certain locomotives at a considerable sacrifice in operating efficiency. Studies of the present bridge demonstrate that the increase in strength effected by the reinforcement carried out in 1900 represents all that can reasonably be done while a careful system of inspection discloses those evidences of distress resulting from the heavy loading and certain faults in the construction that point definitely to the need of a new bridge.

### A Careful Study of the Site

Having concluded that a new bridge was necessary, the next step was to determine the character of the bridge to be built and its location. A decision as to this was founded on a careful survey of the vicinity of the existing bridge, including a study of such geological data as were available or could be had by means of borings. Evidence indicates that the rapids gorge was formed by a pre-glacial stream and was once of a much greater depth than as now occupied by the Niagara river. The cleft in the bed rock is of unknown depth and has been back filled by talus slopes which leave the ledges of rock exposed only along the top of the gorge. These facts were not fully appreciated at the time that the

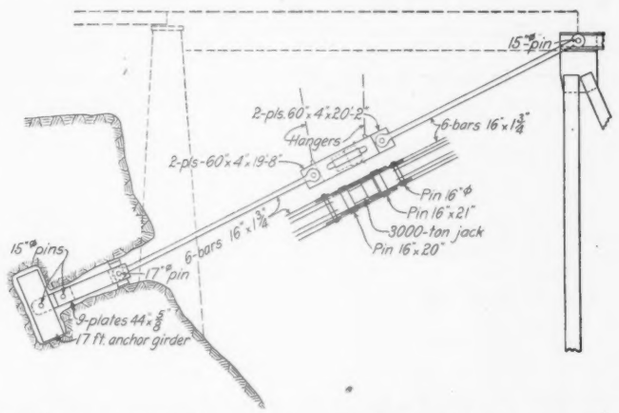
cantilever bridge was built, and a clear span of about 470 ft. was adopted on the assumption that this would permit the founding of all the pedestals of the two towers on bed rock. However, excavations carried to a depth that was causing great difficulty because of the seepage of river water, dis-




**The Three Bridge Sites Are at the South End of the Whirl Pool Gorge**

closed only irregular masses of rocks interspaced with clay and other debris forming what might be termed a natural riprap. A consultation of the leading bridge engineers of the day was called, and after a thorough study it was concluded that "the foundations as projected are as secure as can be had at this place." While the continued stability of the bridge has fully confirmed the conclusion then reached, the condition has been one of more or less concern to those responsible for the structure, and when plans were under way for strengthening the bridge in 1899, core borings were taken with a view to obtaining a more definite knowledge of the foundations and were carried to a depth of 200 ft. before encountering solid rock. These borings were augmented by much more elaborate explorations taken in connection with an investigation for the proposed structure, with the result that the rock faces of the gorge have been located with a considerable degree of accuracy and disclosing that they stand at a much steeper angle than the talus slopes which cover them.

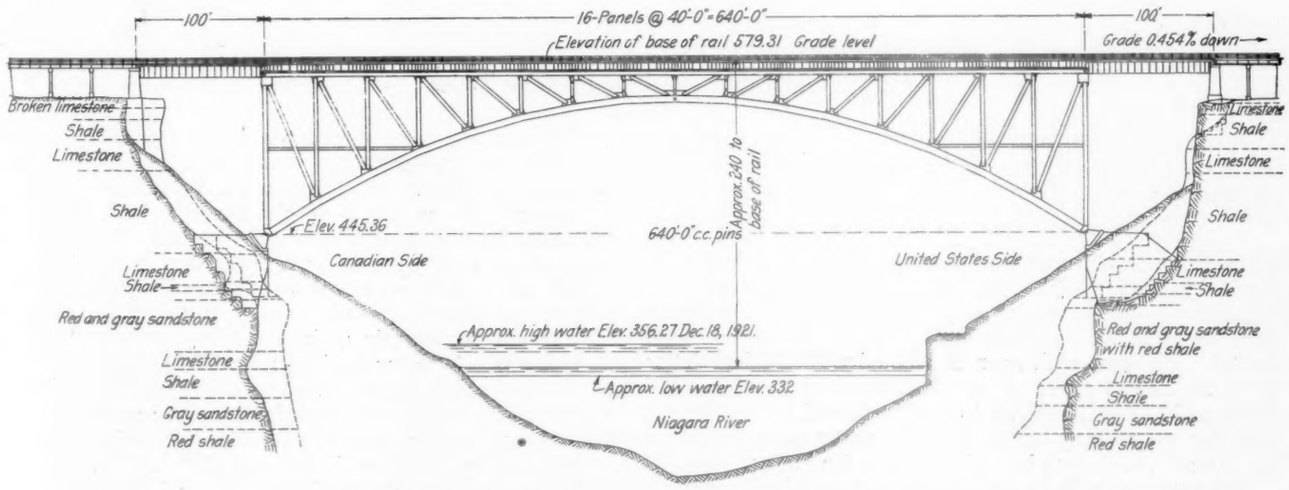
Obviously a site where solid rock is available in relatively steep slopes is much more favorable to a structure giving rise to the inclined thrusts of an arch than to the vertical




**Backstay Construction to Support Each Half of the Arch During the Cantilever Erection**

reactions to be had from most any other type of bridge. However, studies of the site also disclosed the fact that the distance between the faces of the two rock cliffs increases very rapidly towards the south from the Grand Trunk arch. That structure has a span of 550 ft., whereas an arch built at the site of the cantilever bridge, which is located only about 300 ft. to the south, would require a span of 700 ft. to insure bearing on solid rock.

To reduce the length of the arch span and remove the complication of erection, and possibility of delay to traffic over the present line during construction, meant a large saving in the cost of the new structure. Consequently, a site was finally selected as far north of the present cantilever bridge as was possible without unduly encroaching on the right-of-way of the Niagara Falls International Bridge Company, and without complicating the connections with the present tracks at each end of the present bridge. The new



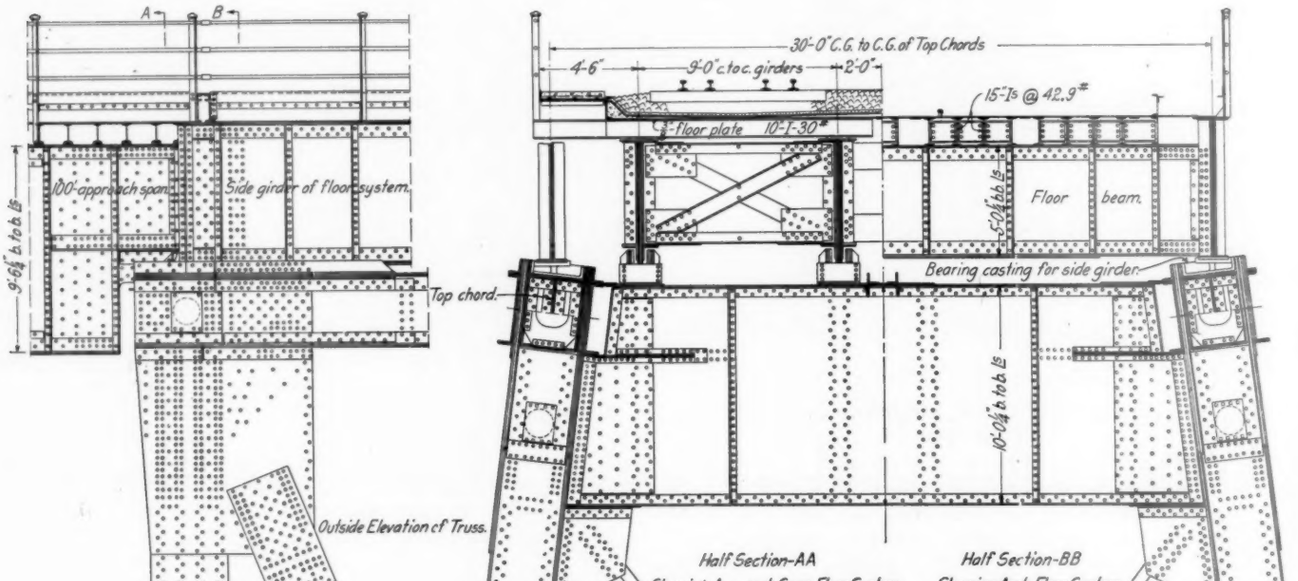

**The New Arch Skew Backs Will Be Founded on Solid Rock**

site selected is in the space between the two existing bridges at an angle of about 4 deg. 18 min. from the center line of the cantilever bridge. This permitted a shortening of the span to 640 ft.

Studies at the site of the bridge also included a serious consideration of the permanence of the foundation rock on which it is proposed to build the structure. In general, the rock structure consists of a series of limestone strata interspaced with shale or mixtures of sandstone and shale that exhibit more or less tendency to disintegrate under the action of moisture. The conclusion, however, is that the covering of rock debris over the less stable materials at a level below that at which the bridge load will be applied is so great as to insure against any possibility of weathering. The general drawing indicates the character of skew backs or pedestals to be provided. These will be seated in the rock in a manner

changes would introduce excessive secondary stresses in these posts if they were provided with rigid connections to the chords. Besides the pins in these posts and the temporary hinge at the crown, 15-in. pins are also to be provided at the two ends of the top chords for the connection of the back stay rigs which are to be provided as described elsewhere for the cantilever erection of the arch. Consideration of secondary stresses also influenced the design of the horizontal struts to be provided on each side to reduce the unsupported lengths of the first diagonal and the first and second verticals. These struts intersect the second diagonal and the third vertical so close to the bottom chords that sliding joints have been provided at these points instead of rigid connections.

With the exception of the bottom chords, the truss members are of ordinary proportions. The bottom chords are of




**Structural Features of the New Bridge**

that would insure against any possibility of sliding and at a sufficient depth below the surface to insure thorough bond in solid rock.

### General Outline of the Arch

In general outline and appearance, the new arch will be similar to the Grand Trunk structure. Both are of the two-truss, two-hinged spandrel-braced type, with the lower chords conforming to the parabolic curve and the top chords horizontal. The new arch span is wider by 90 ft., but flatter by 9 ft., having a rise of 105 ft. instead of 114 ft. in the older arch. The Michigan Central arch will have only one deck for two railway tracks at 13 ft. center to center, while the Grand Trunk arch has a lower deck for highway use.

The new arch will be three-hinged for dead load exclusive of the weight of the ballast for the ballast floor. That is, following the closure at the crown, the top chord members at the center will be riveted solid so that the structure will be a two-hinged arch insofar as live loading and the weight of the ballast is concerned. The design will follow the usual practice of riveted structures except that pin connections will be provided at each end of the first two vertical web members each side of the crown. These posts are so short that the deformations occurring in the arch under load or temperature

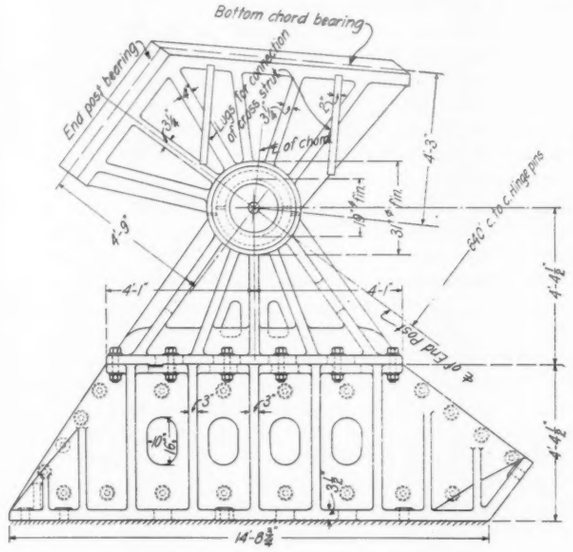
an enclosed box section with two webs, 3 ft. 0¼ in. apart and 5 ft. 6½ in. deep. The two webs each consists of four plates ⅝ in. thick. The angles are 8 in. by 8 in. by ¾ in. throughout, the variation in the makeup being made by changing the thickness of the cover plates. The webs are stiffened at mid depth by two longitudinal angles on the inside and connections are made between the webs at intervals by tie plates attached to these angles. The chord is also braced transversely at intervals by the introduction of diaphragms. To allow for inspection of the chords from end to end on the inside, these diaphragms are pierced with manholes and access from the outside is had by means of manholes through the top cover plate at intervals. The maximum bottom chord section has a gross area of 714.78 sq. inches, to provide for a maximum resultant stress of 9,700,000 lb.

Joints in the bottom chord members are necessarily made at the panel points, and the abutting ends are milled for bearing on only the middle 2 ft. 6 in. of the total depth of 5 ft. 6½ in. However, none of this bearing area is taken into account in the design of the riveted connection since these chord connections have been proportioned for a 100-per cent riveting. The two trusses of the arch are to be set at a batter of 8 vertical to 1 horizontal, and all members of the trusses including the top chord are to conform to this

batter. Where latticing is used, it is composed of stiff members, either channels or angles, and where the latter are used, in a few cases, they are forged flat at the ends for making connections to both legs.

### Ballast Floor Provided

Because of difficulty encountered in the old bridge on account of brine drippings, it has been decided to provide a complete ballasted deck for the bridge. The floor system is of unusual design because of these considerations. First, it




**Outlines of the Skew Back Bearing**

was desirable to provide a floor construction that may be easily raised to a new elevation as may be required for a future raise of grade. Second, it was considered best to have a floor that was largely independent of the truss construction to avoid the complications often encountered in long spans by reason of the changes in length of the chords with the load or temperature stresses. The third influence is the fact that the top chords like the other members of the trusses are in the inclined position of the plane of the trusses instead of having their webs vertical.

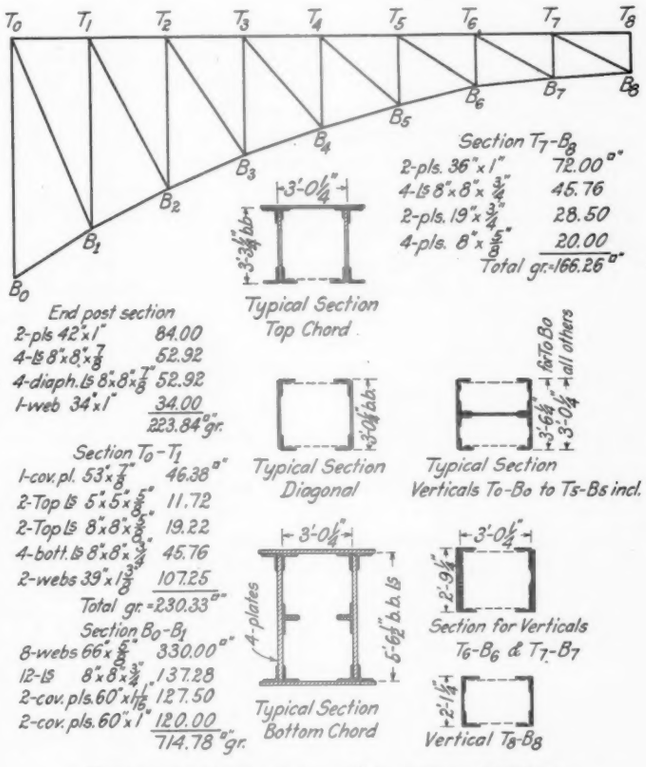
These problems have been met by making the floor independent of the trusses and also dividing it into separate units, each one panel long. The floor will consist essentially of a line of longitudinal girders supported over each truss by bearing castings at the panel points designed to compensate for the inclined position of the top chord cover plates. These girders, in turn, will support floor beams spanning transversely at intervals of 12 ft. 2 in., but with end floor beams for each panel at each panel point, the two adjoining beams being 3 ft. 6 in. apart, center to center. The floor beams will serve as the support for the stringers of the solid floor. These are to be 15-in. 42.9-lb. I-beams, resting on the top flanges of the floor beams and arranged in groups of four under each rail. These beams are to be covered with a continuous ⅜-in. deck plate which, together with a layer of reinforced concrete, to form the trough that is to receive the ballast. The concrete covering is to be sloped so as to provide adequately for drainage.

The arch structure is to be flanked by 100-ft. deck girder spans to bridge the gaps between the ends of the arch trusses and the rim of the gorge. These girders are to be 9 ft. 6¼ in. deep, spaced 9 ft. center to center and floored with a solid deck composed of 10-in. 30-lb. I-beams spanning transversely, 1 ft. 4 in. center to center and covered with a ⅜-in. plate and a concrete trough for ballasted tracks in much the same manner as for the main span. These girders are supported at the ends of the trusses by a cross girder 10 ft. deep spanning between the end posts.

### Heavy Bearings Required

The skew back hinged bearing for large arches is made in various ways. On the Michigan Central arch this will consist of a simple pin joint of large proportions. The pin is to be 19 in. in diameter and approximately 7 ft. 6 in. long, and will weigh 4 tons. The top shoe will weigh 19 tons and is provided with bases to take the top chord and the end post. It will also have two large projections on the side to frame it to the cross strut, since this strut is to connect the two shoes rather than the bottom chords. The distribution of the thrust to the masonry requires two tiers of bearing castings, the lower one being in two sections. The weight of one complete bearing, including the pin, will be about 96 tons.

Another interesting bearing is introduced at the outer ends of the 100-ft. approach spans; these spans are rigidly connected to the ends of the arch trusses, so that all changes in the lengths of the top chord of the half arch and the girder span resulting from temperature or elastic deformation under load must be accounted for at the outer ends of these girder spans. This amounts to about 7 in. (3½ in. in either direction), for each of these bearings, and necessitates




**Typical Sections of the Main Truss Members**

the use of full cylinder rollers instead of the segmental rollers usually provided. This will also necessitate the use of a slip rail joint in the track.

The new bridge has been designed for E 70 loading according to New York Central Lines' specifications for steel railway bridge, with some minor modifications. The impact factor has been calculated by the formula

$$I = \frac{15{,}000}{30{,}000 + L^2}$$

This is about half of the usual impact allowance, but is justified in this case because the location is such that the movement of a train across the bridge at a speed in excess

of 20 miles per hour is almost out of the question. The specifications also contain the proviso that impact allowance shall not be less than 10 per cent in any case. The unit stresses are in proportion to a unit stress in tension of 20,000 lb. per sq. in. for dead load and erection, and 18,000 lb. per sq. in. for live load. The material will be open hearth, medium structural steel having an ultimate strength of 56,000 to 64,000 lb. per sq. in. and a yield point of 33,000 lb. per sq. in. The minimum elongation is 25 per cent. Rivets in the bottom chord will be 1-in. and 1¼-in. diameter for shop and field respectively. Rivets in the top chord and the web members will be 1-in. diameter for field rivets, and 1-in. diameter and ⅞-in. diameter for shop rivets. The largest member, the first section of the bottom chord, will weigh 70½ tons. The total weight of the arch truss will be 4,800 tons. The floor weighs 1,200 tons, bringing the total, including approach spans and backstays, to 7,500 tons.

### A Noteworthy Erection Plan

The maximum horizontal pull in the backstays required for the cantilever erection of the arch before the closure has been effected at the crown is 3,700,000 lb. for each truss. This will be resisted by a diagonal stay consisting of eyebars extending back into the bluff where an anchorage will be provided in a tunnel excavated in the rock. To provide means of increasing or decreasing the lengths of these backstays so that the distance between the closing members of the opposing halves of the arch may be adjusted with perfect accuracy, the eyebar stays have been designed so that they can be lengthened or shortened by the operation of 3,000-ton hydraulic jacks located between heavy sliding plates to which the eyebars are pinned. The depth of the anchorage has been determined on the basis of conservative assumptions concerning the frictional resistance and shearing strength of the rock ledge into which it will be secured, but this depth may be increased as may be found necessary in the judgment of the engineers based on the condition of the rock as disclosed by the excavation.

The design of this bridge has been developed under the direction of H. Ibsen, special bridge engineer, who has been assigned to this project, assisted by C. L. Christensen, assistant bridge engineer. The project is under the general direction of J. F. Deimling, chief engineer, Michigan Central, Detroit, Mich. Colonel George H. Webb, late chief engineer of the Michigan Central, had the general direction of the project from its start until he went to France in July, 1917, as lieutenant-colonel with the Sixteenth (Railway) Engineers, and also after his return from France in April, 1919, until his death on November 3, 1921. Olaf Hoff, consulting engineer, 50 Church street, New York City, is acting as advisory engineer on the project.

# Report on Collision at Denver, Indiana

In a collision of freight trains on the Lake Erie & Western, near Denver, Ind., on November 9 last, between northbound freight No. 82 and southbound freight No. 83, both moving at good speed, two locomotives and 14 cars were wrecked and the engineman of No. 83 was killed. Two other employees were injured. The damage to cars, engines and roadway amounted to $35,673.

This collision was investigated by the Bureau of Safety of the Interstate Commerce Commission and was found to be due to the failure of Operator McCarty, at Peru, to make a train order legible. No block signal system is in use on this road and the movement of these two trains at this juncture depended wholly on a train order, issued at 4:30 a. m., requiring No. 82 to wait at Denver until a certain time: 5:20 a. m. as given to No. 82 and 5:30 a. m. as given to No. 83. No. 82 passed Denver at 5:22 and soon met No. 83.

The testimony given before the inspector was conflicting and some of it apparently false, but the conclusion of the inspector is that the order as telephoned by the dispatcher was worded 5:30 a. m. The inspector concludes that McCarty received and repeated it as such, though he delivered the order to the conductor showing apparently 5:20; that the conductor read it aloud to the engineman as 5:20; that the error was not then discovered; that McCarty did not check the reading from a copy; that by using only one carbon, he made only two copies and subsequently made one, for his own file, from memory; and that in a subsequent conversation over the telephone, he had called the hour 5:30, although he maintained before the inspector that the order read, and moreover indeed that it should have read, 5:20 a. m.

A photograph of the order shows the *5* of normal size and the *30* smaller, and written above the line, like the numerator of a fraction. The inspector concludes that McCarty intended to write *3*, while yet the length of the last stroke of the pen at the bottom of the figure, and the small size of the upper part of the figure, make it look like *2*. Comparison with other figures in the same order confirms the belief that McCarty intended to write *5:30*. The copy made by McCarty after the train had departed had been filed on a spindle so that the figure in question was obliterated or mutilated to such an extent that its true character could not be determined.

Since this collision, the rule has been changed to require the time in the body of train orders to be shown in words as well as in figures.

**A Baldwin Locomotive on the Andalusian Railway, Spain**

# New England Divisions and Transportation Act

## An Analysis of the Intent of the Law and the Economic Bases Underlying This Problem

By J. Shirley Eaton

IN TWO PARTS—PART I

THE Transportation Act of 1920 which has centered in the Interstate Commerce Commission vast powers has also, in its provision for group maintenance of carriers, disclosed the anatomy of the economic structure placed in the keeping of the commission. In effect, it declares that throughout the body of shippers thus embraced in the group is a community of interest in the maintenance of a service of intercommunications. In recognition of this common interest is set up the mechanism of solidarity to cope collectively with the conditions the consequences of which are common to all within the group. The practical problem is primarily to make the correct grouping of shippers to be served and secondarily to designate the particular carriers which shall perform this service and to fix the terms on which this service shall be rendered.

It will be recalled that the initial action by the New England carriers in the New England Divisions Case grew out of the circumstances of the general increase in freight rates in the latter part of 1920. Because of the inclusion of the New England roads in the same group as the Trunk lines and the Central Freight Association lines in the computation of the relief required, the New England lines asserted that the flat percentage increase thus derived gave to the carriers of the eastern group outside of New England approximately $25,000,000 annually above their needs, while yielding to the New England carriers approximately the same amount less than their needs annually.

In the first complaint, submitted April 23, 1921, the New England carriers nominally sought relief from alleged unjust division of through rates, but the defendants contended that this was only a device by which the plaintiffs endeavored to procure restitution of the approximately $25,000,000 referred to above. It is certain there has been from the first much confusion of the two issues. The idea of recovery of a definite part of the proceeds of the rate increase has never been entirely absent, though the plaintiff's counsel were explicit that they sought only the revision of unjust divisions.

### What is Meant by "As a Whole"?

The law provides that the rates shall be such that the carriers "as a whole" (or "as a whole" in rate groups or territories designated by the Interstate Commerce Commission) will under efficient management and reasonable maintenance "earn an aggregate annual net railway operating income equal as nearly as may be to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation." The crux of the present case is what is meant by "as a whole." There will arise questions as to what is efficient management and what may be reasonable maintenance; what constitutes fair return and what is the value of each carrier's property. All of these have for some time been matters of controversy and for some of them certain criteria and definitions have been worked out. But the law now brings in the conception of "as a whole" without defining its implications.

Was there by this expression directly set up a formal pool of gross revenue in which each road had a specific equity? Or was it only intended to set up a statistical entity from which to deduce a common formula by which each road in the group should levy its individual revenue?

It will throw light on the intent of the law to ascertain what effect these respective constructions would have upon the obvious rights involved. If the first construction is found to be absurd and therefore impossible it will be necessary to find a place for the conception "as a whole" either in private property in the free state of unrestrained competition, or in the several stages of voluntary association up to formal collective bargaining and the fully developed pool.

Beginning with the first hypothesis, if by the expression "as a whole" the law intends to set up directly a formal pool of all the revenue of all the roads in a group indiscriminately, the weak with the strong, the gross revenue thus pooled would necessarily include the expense to produce it. This would mean that when a carrier disbursed its own funds for such expense, it not only spent its funds but besides became liable to account for the amount thus spent to the general fund in which its individual share bore no certain relation to what it had spent. The palpable absurdity of such an outcome disposes of this construction at once. If we adopt the modified theory that the pool applies only to the proceeds of the change in rates we get no further. When the change is an increase, the fund created for the pool, it is true, includes no part of the expense of each road since the previously existing rates presumably covered the out-of-pocket expense to earn the revenue under them. But neither does the amount of the increase include *all* of the funds which arose out of the common circumstances that furnished the basis of the pool. It would be very difficult to determine exactly what was the base rate belonging to the road individually on which to base the differential by the new rate out of which the pool was created.

Therefore the theory that a formal pool was directly set up we believe must be discarded. There remains to test the hypothesis that the expression as a whole in the law merely sets up a statistical entity. It may be that we shall find the provision for the use of this figure accomplishes the pool indirectly as inevitable consequence.

Most property is in the form of investment which is either a fixed physical thing in use or an assemblage of physical things maintained as an entity in use. For practical purposes the amount of the annual proceeds arising from such use is the only real property under discussion. In the processes of free, unregulated business these proceeds are profits and profits are finally limited on the one side by conditions outside the property producing the profits. A condition arbitrarily imposed that alters in any respect this external limit strikes at the whole structure of property values and in order to prevail must be justified by compensating considerations. In the natural state of free business with which we begin, the spread between the producer's cost and the value to the consumer is the gross gain or proceeds of the production. Part of this gross gain goes to the consumer. That part which goes to the producer is producer's profits. The actual private property in a plant in use by custom resolves itself at last into the capitalized value of these profits.

In the free play of unregulated business the producers

group about the commodity produced theoretically in the order of their production costs from the lowest cost producer up to the marginal producer, each by turn asserting his prior claim in the order of his position in a scale of costs and to the extent of his capacity to produce. The price for all is limited by the marginal man's costs (together with his profits if any). Each producer as he differentiates his own costs below this base determines his individual profits. Progressive modifications of this natural definition of private property are brought about when any one producer abstains in favor of another from the full advantage of his competitive position. Under such circumstances arise equities to the one producer in the proceeds realized from production by the other producer. So far and in such respect as the one producer abstains from competitive advantage over another he equalizes with that producer. For convenience we may designate the groups of producers where such modifications of original positions in the free state are found and where resulting equities arise, as collectivistic in contrast with the competitive group in the respect and to the degree these modifications exist.

### Collectivistic vs. Competitive Conception

In searching for the true significance of the expression "as a whole" the inquiry centers on the distinctions between the collectivistic and the competitive conception. Their difference is fundamental. The fact that the collectivistic and the competitive group are both based upon a given commodity or service at a common price is a likeness that is illusory and misleading. We, therefore, will examine in detail these two kinds of groups in respect to how the price was constructed, how the aggregate of profits was made and on what formula this aggregate was distributed.

Let us first examine the competitive group. In the free play of unregulated business the competing buyers and sellers gathering about the same commodity form on either side a competitive group, competitive in the determination of the price of the commodity (or service), competitive in the production of the aggregate gross advantage to be realized by the exchange of the commodity, competitive in the distribution of this aggregate of gross advantage among the several buyers and sellers. Each producer up to his capacity to produce, and in the order of his advantage by lower costs, seizes the demand from all the other producers; and each consumer up to his capacity to consume, in the order of his advantage by higher consumer's rent seizes the supply from all the other consumers. The grouping both on the producer side and on the consumer side is entirely informal. In each case it is merely an aggregation of striving elements individually in violent competition but together forming a mass that is tensely coherent because each buyer demands for himself the price of the least advantaged buyer and each seller demands for himself the price of the least advantaged seller. Among the producers no one exercises any control over another except as the price negotiated by the marginal producer for his own account automatically fixes the upper limit of the price for all lower cost producers.

The price to all is identical because all producers, each in the priority of his lower costs and up to his capacity exacts the highest price paid to any one producer. Therefore while the price is common to all it is really an individual price which each producer levies on the basis of his economic position. It is absolutely not a price for the group as a whole, though all the producers individually conform to it. And the profits never having been produced by the group as a whole, the several individual producers do not hold title to their profits in form of proportional parts of a thing that never existed as an entity.

The profit of each producer is, as we have seen, the differential of his costs below the costs (and profits if any) of the marginal producer whose costs with such profits as he could secure fixed the price which any other producer was able to charge. The total yield of profits derived in this way is the aggregation of these individual profits. The price which all the producers used was not constructed to produce this aggregate but only, as we have seen, to cover the costs of the marginal man together with what profits he could bargain for. The aggregate of profits to all others than the marginal man *resulted* from the price; it was *not the cause* of the price. Aggregate profits therefore is not an entity but a mere arithmetical total of individual instances bearing no common relation one to another or to any other thing.

And as to the "distribution" of this total of profits, as there has been no aggregate entity to be distributed so there has been no common formula by which the several carriers collected their individual profits. Instead of a "distribution" of a common fund there has been only a series of individual profits, individually exacted, each producer seizing what he could and holding what he has seized. Possession is ownership, full and unqualified. By no producer has there been collection for account of another or for any outside consideration whatsoever.

This then is the competitive group making the free market and these then are the conditions on which rest the values of each producer's profit in that market. Nothing is construed, evolved, or controlled "as a whole." Not in the price, nor in the aggregate of profits, nor in the "distribution" of this aggregate of profits is there anything in any wise compatible with the "as a whole" notion. In last analysis property under these circumstances is a property in natural differences. Whatever overcomes or reduces these differences except it be other natural differences is artificial in the sense that it is a consideration imported from outside the immediate conditions of the exchange where it is made to apply.

If in the competitive group and its competitive processes there is no possible application of the idea of "as a whole" the law must refer to some other kind of group. In fact as we shall presently see, at one stroke, the competitive group has been abolished and the collectivistic group substituted.

### The Collectivistic Group

With the analysis of the competitive group as background let us next examine the collectivistic group. The essential principle of collectivism is the taking from one in the group to give to another in the group in respect to some phase in which they severally differ in order that both may be equalized (or proportionally equalized) to the terms of a given formula. Incidentally the equalization involved in this collectivism may be effected directly between each by turn with every other or more simply through the mechanism of a joint fund to which all contribute and from which all draw to accomplish the desired equalization.

In the present case the aggregate gross revenue to be produced which would yield the added net income, was determined from the situation of the producers as a whole, for it was the amount needed to produce the declared reasonable rate of return on the aggregate of the properties of all of the producers taken together, and therefore it was collectivistic. It is primarily a statistical entity but it is more than that; it constitutes the budget on which, under the law, the authority for the rates authorized by the commission rests. A budget is the basis for an appropriation. This budget is the basis for the appropriation from the shippers. It was computed as a definite amount, based on the needs of all the roads taken together ("as a whole"). In this respect it was sharply different from the aggregate yield in the competitive group which rested on the marginal producer's situation primarily, joined with each successive producer's cost position with reference to the marginal man.

The budget which the authorized rates were to produce, like any budget, set up equities in favor of the individuals whose stated needs taken together constituted the budget.

The distribution of the amount created by the budget would be to each in the proportion it contributed to the making of the budget.

Price in the collectivistic group as in the competitive group is identical but this identical price is no longer a series of individual prices coinciding on an identical figure. It is deduced as a single figure from the aggregate necessary yield to be produced. Since this aggregate yield required was collectivisticly determined, the price derived from it is collectivistic. Every producer has in some part contributed thus to the making of the price per unit (in case of railroads, the passenger and freight rates) the aggregate of an assumed volume of business without regard to where found, was taken as a base in the calculation. If the product of any one producer had been omitted from the total, the collectivistic rate per unit would have been by so much altered, just as the price would have been different if any one producer had been omitted in making the budget which the price was constructed to produce.

If the price in which these equities exist is to be permitted, it must follow that the same equities lie against the proceeds of this price on the aggregate production wherever produced, since this was the basis of the original calculation in constructing the price charged consumers. In other words the equities derived from the original budget were in two terms, namely price and aggregate volume of production everywhere, throughout the group. One cannot be used if the other is disallowed.

## "As a Whole" Accords With Conditions of Collectivistic Group

From the foregoing it is clear that the conception "as a whole" which finds no place or compatibility with the competitive group and its competitive processes, does accord with the conditions of the collectivistic group and its collectivistic processes. Thus—

1. The aggregate net operating income of the producers as a whole in the group, to produce which aggregate the price is authorized is a definite entity created by merger of the desired net operating incomes of all the several producers in the group. Therefore it is collectivistic.

2. When the above collectivistic aggregate, for the purpose of collection, is resolved into prices and estimated volume of business on which the prices apply, the collectivism in the original aggregate necessarily carries over into the prices charged and finally the proceeds of revenue above cost to produce this aggregate is impressed with the collectivism in the price which produced it. This collectivism is in the net proceeds of the price and not in the gross proceeds because cost is distinctly individualistic, special and particular to each producer and must be repaid to the individual producer before there is available anything for the producers as a whole.

3. The equities in the fund above, of aggregate of net operating income, constitute an explicit schedule for the proportionate allotment of that fund. The allotment is necessarily proportional because the fund actually realized from the body of authorized prices can never be made to exactly equal the amount of the original budget it was intended to meet, since it is based on estimate of future business.

Incidentally in a competitive group, because limited to bargaining with the marginal producer alone, the consumers are forced to forego all claim to share in the excessive profits (by differential costs) of the rest of the production which lies behind the marginal position. The merely accidental situation of the marginal producer, with reference to the aggregate of effective demand is made the determining factor in negotiating the exchange between a vast volume of supply and demand. In the collectivistic group this is not so. The costs of all the producers together enter into the negotiation and become the basis of the give and take—the equitable adjustments and mutual accommodations that are brought to bear in working out the terms of the deal.

The antithesis of the competitive and the collectivistic groups each to the other is complete and permits no compromise. Thus when the price is competitively made; i.e., when it is a series of prices individually constructed though placed at an identical figure, it is unthinkable to treat the proceeds at that price as collectivistic; i.e., it is unthinkable that any one producer has any claim to a part of the earnings of another merely because the price was identical. With equal definiteness it is unthinkable that when the price is collectively made; i.e., when it is made to meet the conditions of the producers as a whole, that the distribution may be competitive, i.e., that any producer is eliminated from his share of the aggregate proceeds above cost, of that price, pro rata with his contribution in the making of such price. In such case the original basis which was the legal warrant for the price, after it had been used would then be set aside and there would be substituted an entirely foreign basis of distribution resting on the accident of individual collection. It would be as if a tax collector personally appropriated his collections, based on the schedule the assessor had furnished him.

## Partial Collectivisms

As a modification of the theoretically complete collectivistic group there are found in practice partial collectivisms which arise in the natural stages of organizing business into an orderly procedure. The group of producers or any two or more of them may base their price upon the marginal man but withhold from the market part of their full producing capacity at costs under those of the marginal man and in behind this marginal position thus set up may trade among themselves in the unused elements of their respective situations. To the extent there are these unused elements, the marginal man is a dummy—the "straw man" of the Yankee trader. He is not at the true marginal point. Thus the producers set the price higher than the economic level. When they trade in their unused capacity to produce they are in reality trading in property in which the consumer has economic equities. Their trading may be to effect rearrangement of the natural flow of traffic diverting from themselves to higher cost producers some of this possible added traffic which they could have taken for themselves at a price based on their lower costs and a reasonable profit. To the extent the producers have thus "traded in" their individual relations to the common market there has been effected a solidarity of producers. So far as it goes this is a collectivism, a composition or fusing of elements into a larger entity, setting up contractual equities against actual possession. It is collective bargaining on the part of the producers making a general price. But without like solidarity on the side of the consumers there has not been achieved full collective bargaining and therefore the resulting collectivism is not complete. As noted in discussing the complete collectivistic group, any collectivism in price extends to the net proceeds derived from that price when applied to production which originally was used in making the price. To the extent of the two or more producers whose situations have been treated as a whole there has been set up among them a pool in respect to the designated phase of their differences thus treated as a whole. The outstanding equities thus created against the proceeds of actual production by an individual producer, it is true, are restrictions on ownership of property in hand, but so far as they are the result of voluntary trades among the producers themselves they represent considerations in some form which have been already realized. Therefore they are not impairments of original property. There is therefore nothing either novel or inequitable so far as the producers are concerned in a situation in which one producer has equities in the net proceeds of the production of a computing producer. As between the producers involved the only

question that applies is whether such a consideration has actually passed and whether it is adequate.

These considerations are incidents of maintaining a common price (or standard of service) at a level that is impracticable or against the individual interest of one or more producers. Regardless whether this price level (or service standard) is imposed by producer or consumer or by both in bargaining collectively on both sides, producers' solidarity is necessary. This solidarity is effected by one producer giving to another compensatory rights in his competitive position or in the net proceeds of his earnings, according to the form the integration takes. In voluntary association such rights are defined by contracts; and collection under the contracts is simplified by placing the administration of the contracts in the hands of a neutral agent called "commissioner."

When the solidarity of the producer embraces all producers and when it is opposed by like solidarity among all consumers, the collective bargain is all embracing. It is a simple matter to replace the commissioner of the voluntary association by a governmental agency and give the findings of this agency the force of court rulings. But when legal solidarity displaces voluntary solidarity no change of rights is necessarily involved. It merely becomes incumbent on the governmental agency to the degree of the absolute power committed to it to protect with meticulous care such of the equities, originally protected by mutual contract, as now survive when the collective bargain is extended to include all the consumers.

To meet the conditions of a loosely aggregated general society the law in general defines certain rights as to estrays, accidental happenings, general and special contingencies. When operations become intricate, when simply separable physical things give place to enormous complex entities subjected to the effects of remote, indefinite, interrelated causes and contingencies, the problem of defining equities becomes difficult but the principle of right on which these equities rest is not thereby altered.

When the original competitive grouping has given way to the collectivistic and when this collectivistic operation extending and intensifying has expanded to the complete collectivism of the fully collective bargain effected through the governmental agency, independent action is extinguished. Interacting causes arising out of the adjustments of this collectivism must not be left to lodge their effects without an accounting. Vagabond earnings must be restored to their rightful owners and losses charged to their source. The era of maverick steers is gone.

# Appropriations Recommended for I. C. C. and Labor Board

WASHINGTON, D. C.

THE Interstate Commerce Commission has failed in its effort to persuade the House committee on appropriations to increase its appropriation for railroad valuation work above the amount recommended by the Bureau of the Budget in order to enable it to expedite the work of completing the valuations. The committee on January 6 reported to the House a recommendation of an appropriation of $4,564,500 for the commission for the fiscal year 1924, made up as follows: Salaries of the commissioners and secretary, $139,500; general expenses, $2,100,000; Bureau of Accounts, $550,000; Bureau of Safety, $350,000; Bureau of Locomotive Inspection, $300,000; Valuation, $1,000,000, and printing and binding, $125,000. This is $481,150 less than the total appropriations for the current fiscal year but is $50,000 in excess of the budget estimates, this increase being applied to the appropriation for the Bureau of Accounts.

The committee also recommended an appropriation for the Railroad Labor Board of $340,000, $10,000 less than the current appropriation, but the same as the budget requirements. The board had asked for an additional appropriation of $100,000 in order that its statistical bureau might be enlarged and its scope extended. The Interstate Commerce Commission had made strenuous efforts to have a greater sum allowed for the valuation work to the amount of its estimate of $1,280,000 which, it said, had been held down as closely as possible to comply with the desire of the administration to hold the government's expenditures within the estimated revenues. Its last appropriation for this purpose was $1,300,000.

Commissioner Lewis, who appeared before a sub-committee of the House appropriations committee, compared the work to that of a house which was all done except putting on the roof. This, he said, could be done for the $280,000, whereas the cost of the work to date has been approximately $85,000,000, of which over $23,000,000 has been spent by the Interstate Commerce Commission since 1913 and over $60,000,000 by the railroad companies. He also referred to this less metaphorically as "$85,000,000 of paper in a ramshackle fire trap," pointing to that as one of the reasons why "we ought to get it all worked up into reports before something strikes us." With the additional $280,000, he said he would be willing to promise that by July 1, 1924, the commission will have issued all of the underlying engineering, accounting and land reports and practically all of the tentative valuation reports, 1,130 all told, of which 306 had already been served. This would include holding hearings on 300 or 400 tentative valuation protest cases.

If only given $1,000,000, he said, the commission would probably be able to complete the underlying reports, but would not be able to issue all of the tentative valuation reports nor be able to do the work of policing and checking and bringing up to date the reports of the carriers or the work of certifying values for recapture purposes or to value the intangible property because if those things were done it would be at the sacrifice of getting out the underlying reports. After bringing the work up to that point, he thought from $200,000 to $400,000 would be necessary to keep the work current. Mr. Lewis said that when the late Director Prouty had promised the country that the work would be completed by about this time, he had really meant to promise that he would complete the field work, which has now been completed, although the impression had been made that he was going to complete the entire work. In the last three months the commission had scheduled 43 hearings on tentative valuations and it had just authorized the hearing of 77 more cases. If the commission should be called upon to prepare underlying valuation data for a general rate investigation in the early part of 1923, Mr. Lewis said, it would have 75 per cent of the underlying values to guide it as compared with 15½ per cent at the time of Ex Parte 74 and 47.7 per cent for the 1922 case.

Mr. Lewis went into considerable detail regarding the progress made and the reduction in expenditures that has been made as a result of the completion of the field work and he also pointed out the importance of completing the valuation work as speedily as possible, in response to statements by Chairman Wood of the sub-committee indicating an opinion that most of the money had been wasted. Mr. Wood said he did not believe the commission had gotten 15 cents worth in results for the work done up to the time of the conclusion of the war because of the great increases in value. Commissioner Lewis pointed out that it was not the intention to disturb the values as already found for the various valuation dates, but to bring them up to date by adding the increase in property since.

Commissioner Lewis said that "while some people may be tired of this valuation business and think it was ill-

advised," he thought it was one of the best things this country has ever done. He pointed out that in 1920 Congress had adopted a new code of railroad regulation, taking as its basis for rate-making the valuation act of 1913, and that the recapture provisions, consolidation provisions and regulation of security issues all depend to a considerable extent on the valuations. If the request for $1,280,000 is cut to a million dollars, Mr. Lewis said, he thought it would make a difference of five years in the completion of the work and the commission would inevitably lose some of the men who are vital in bringing it to a conclusion.

Commissioner Esch, Secretary McGinty, T. P. Artaud, supervisor of land appraisals, and A. Wylie, director of accounts, also testified in support of the commission's appropriation estimates. Commissioner Esch gave many figures to show the enormous increase in the work imposed on the commission and the importance of maintaining adequate organizations in the various bureaus. He also pointed out that the commission in a way is not master of its own expenditures because Congress may entail large work and expenditures by the passage of resolutions calling for special investigations without making special appropriations for them. For instance, a resolution passed by the Senate without a record vote and without comment called for an investigation of the Transcontinental Freight Bureau which required the service of examiners and other experts for many days. Another resolution requiring investigation of the financial transactions of the Denver & Rio Grande and the Western Pacific has required five examiners and two clerks for a period of 155 days and is not yet finished.

Secretary McGinty pointed out that the turn-over among the commission's employees in the 1922 fiscal year was 15 per cent and in previous years had gone as high as 50 per cent because the carriers and shippers' organizations took away regularly many of its best employees. He said the carriers take the head men away and the business organizations take away their assistants, paying them larger salaries than the commission can pay. Director Wylie, of the Bureau of Accounts, pointed out that his department is actually profitable to the government, in that it has saved by checking the carriers' returns considerable sums in the amounts paid to the carriers under the guaranty provisions of the federal control and transportation act. Checking of the standard return figures, he said, had saved the government $3,250,000 and he estimated total savings amounting to about $12,000,000. If the appropriation for the bureau were held to $500,000, he said, it would mean that the commission would be in the position of being obliged to accept on their face the statements that the carriers may make as to the amounts due them on claims for the six-months' guaranty and in their returns as to excess income.

The appropriation as recommended by the committee will be passed on by the House of Representatives, but it is rather unusual for the House to make increases over those recommended by the committee. However, there is a chance that the Senate might increase the amount and thus throw it into conference.

G. W. H. Hanger, a member of the Railroad Labor Board, testified before the committee regarding the work of the board and its need for the amounts requested.

# Cotton Belt Rapidly Overcoming Effects of Strike

## Traffic Larger Than in Any Previous Year Except 1920 —Increased Equipment Maintenance Costs

THE COMBINED STATEMENT of the St. Louis Southwestern and the St. Louis Southwestern of Texas for the 11 months ended November 30, 1922, shows a net railway operating income of $3,876,864. This compares with $4,156,500 for the same period of 1920 and apparently indicates that the Cotton Belt will not be able to show quite as good net earnings for the full year 1922 as it showed in 1921, but that the difference as between the two years will not be a great one. Net railway operating income shows the earnings from operation and before fixed charges. The net after fixed charges in 1921 was shown in the annual report for that year to be $2,493,482, all of which was appropriated for investment in physical property. In 1920, the net after fixed charges was $2,959,837—a total which 1921 failed to equal by $466,355 and a total which it would appear at this time as if 1922 will also fail to equal. All of the 1920 net, as in the case of that for 1921, was appropriated for investment in physical property. From the 1922 net there will have been paid the semi-annual dividend of 2½ per cent on December 15.

The outstanding feature of interest just at present in connection with the Cotton Belt is its dividend and the reason is that the payment made on December 15 was the first declared since 1914. The Cotton Belt has been showing very favorable earnings in recent years and the margin over what would have been its preferred dividend requirements has been a wide one. The company's business has expanded rapidly. In 1913, for example, revenue ton-miles totaled 871,985,756. In 1917, the figure was 1,270,829,273; in 1920, it was 1,815,775,668. In 1921 there was a falling off in traffic but the revenue ton-miles, although 28.60 per cent less than in 1920, were sufficient to exceed those for any previous year except 1920. The 1921 figure was 1,296,385,810. This increase in business has been naturally accompanied by still greater increases in gross—due to the rate increases of the past four or five years—and also by increased figures of net as is evidenced in the table showing these items. The net has all been put back in the property, either held in surplus account, or as in 1921 and 1920, entirely applied to physical improvement. As already noted, no dividends were paid on the preferred between 1914 and 1922.

The Cotton Belt's 1922 traffic has been much in excess of that for last year but not as large as in 1920, which means that the ton-miles this year will be, with the single exception of 1920, better than in any previous year. The latest 1922 figures showing details of traffic handled are those for October and for the ten-months' period. The figures are given separately for the northern and the Texas lines and in net ton-miles which include both revenue and non-revenue freight. A comparison follows:

NET TON-MILES—10-MONTHS' PERIODS ENDED OCTOBER 31

| | St. Louis Southwestern | St. Louis Southwestern of Texas |
|---|---|---|
| 1920 | 1,246,928,000 | 413,546,000 |
| 1921 | 901,770,000 | 305,508,000 |
| 1922 | 1,073,391,000 | 330,498,000 |

The 1922 figures show the increase over 1921 and that the 1920 totals have not quite been reached. September and October were the two best months in 1922; in each case they

exceeded the corresponding figures for 1920 but they were not equal to the figure for August, 1920, which was the peak month that year.

Net earnings for 1922 have been adversely affected by the shopmen's strike, the results of which were reflected in as late a report as that for November, although it is expected that there will be less evidence of them in the December report. There was an increase in gross income for November and for the 11 months but this was more than balanced by increases in expenses, notably for maintenance of equipment. The Cotton Belt, however, has maintained its service well and the *Railway Age* is advised that it has been doing as well or better under the strike conditions than any of its neighbors.

The decrease in net with larger gross as a result of increased maintenance of equipment expenses has been a quite common incident in 1922 earnings statements. The increased maintenance of equipment expenses, however, have also included more than strike costs alone. The strike costs, one may presume, reflect a condition which showed on July 1, at the beginning of the strike, a percentage of locomotives held out of service for repairs requiring over 24 hours of only 11.1 per cent, a very favorable figure. On August 15, however, the percentage had risen to 31.2 per cent but on December 1 it had again been brought down to 25.4 per cent. On the other hand, the road's percentage of bad order cars on July 1 was 32.6. This rose to 33.5 per cent on August 1 but on December 1 it had been lowered to 8.0 per cent which indicates a very favorable state of affairs as concerns freight car conditions and a decided improvement over that on July 1.

SELECTED ITEMS SHOWING EXPANSION OF COTTON BELT EARNINGS, ST. LOUIS SOUTHWESTERN AND ST. L. S. W. OF TEXAS, 1913 TO 1921

| Year ended June 30 | Revenue tons | Revenue tons one mile | Freight revenue | Income app. for inv. in physical property | Net income carried to profit and loss |
|---|---|---|---|---|---|
| 1913.. | 3,657,964 | 871,985,756 | $9,864,490 | ..... | $1,886,191 |
| 1914.. | 3,495,537 | 830,028,078 | 9,295,143 | ..... | 335,771 |
| 1915.. | 3,181,267 | 747,474,244 | 7,891,642 | ..... | D 280,993 |
| 1916.. | 3,745,130 | 891,104,359 | 9,183,185 | ..... | 1,267,455 |
| Year ended Dec. 31 | | | | | |
| 1916.. | 4,009,498 | 956,572,396 | 10,369,943 | $132,580 | 2,089,585 |
| 1917.. | 4,996,813 | 1,270,829,273 | 13,062,975 | 971,390 | 2,489,208* |
| 1918.. | 4,872,201 | 1,240,619,003 | 14,365,854 | ..... | 860,652† |
| 1919.. | 4,760,210 | 1,140,459,526 | 15,821,318 | ..... | 1,345,909† |
| 1920.. | 6,356,708 | 1,815,775,668 | 25,280,354 | 2,959,837‡ | ..... |
| 1921.. | 5,147,912 | 1,296,385,810 | 20,827,602 | 2,493,382 | ..... |

*$412,860 of income applied to sinking funds.
†Federal control period, corporate income only.
‡Does not include federal operations for January and February.

The Cotton Belt mileage contained in the St. Louis Southwestern and St. Louis Southwestern of Texas totals 1,776. The St. Louis Southwestern proper extends from St. Louis to Texarkana. From the latter the St. Louis Southwestern of Texas branches out into a number of lines which reach Fort Worth, Dallas, Sherman, Hillsboro, Stephenville and White City. There is also a branch to Shreveport, La. The connection to St. Louis is obtained by trackage rights over the Illinois division of the Missouri Pacific from Thebes; the Missouri Pacific uses the Cotton Belt, on the other hand, from Thebes to Paragould for freight service. Cairo is reached by a branch which in former days before the St. Louis arrangement was made was Cotton Belt main line. Formerly freight traffic destined to and from Memphis was handled by the Missouri Pacific between Memphis and Fair Oaks, Ark. at a stipulated rate per ton, but in 1920 this contract was cancelled since which time this traffic has been handled by the Cotton Belt through a long term trackage arrangement with the Rock Island.

Cotton Belt traffic in its earlier days was largely lumber. At present its traffic is divided as follows, the per cents used being those for 1921: Products of agriculture, 18.92 per cent; products of animals, 0.96 per cent; products of mines, 31.39 per cent; products of forests, 23.53 per cent, and manufactures and miscellaneous, including l.c.l. merchandise, 25.20 per cent. Wheat in 1921 constituted 1.11 per cent; cottonseed and products, 3.67 per cent. Bituminous coal makes up but a small proportion of Cotton Belt tonnage—in 1921, only 4.51 per cent.

## Large Traffic in Oil

Oil, however, makes up an important share. Crude petroleum in 1921 made up 6.44 per cent of the total tonnage and refined petroleum and its products, 7.37 per cent.

To go beyond this array of dry details, one should first point out that the traffic in refined petroleum and its products is received largely from refineries at Fort Worth. No crude originates on the Cotton Belt lines although it is fairly safe to say that every square mile in the territory served has been prospected for oil. The crude which makes up an important part of Cotton Belt tonnage is from the Hainesville and El Dorado fields. From the former the movement is via the Louisiana & North West; and the crude reaches Cotton Belt rails at McNeil, Ark. The El Dorado crude originates on a line of the Rock Island and is delivered to the Cotton Belt at Fordyce, Ark. The traffic in pipe and other oil well supplies to these fields from the east gives the Cotton Belt some of its best paying traffic.

The Cotton Belt originates about one-half its revenue tonnage. In 1921 it originated 55.84 per cent and in 1920, 46.64 per cent. The traffic is well balanced; in 1921, 58.76 per cent was northbound and 41.24 per cent, southbound.

The Cotton Belt in recent years has been favored with a rapidly expanding business in fresh fruits and vegetables, resulting from the increasing production of these commodities along its lines. The road maintains a demonstration farm at Brunswick, Tex., and it also has a marketing agent for the purpose of assisting the farmers in selling their products. This traffic is playing an increasing part in Cotton Belt activity; it moves in the latter half of the year, which is one of the reasons that Cotton Belt earnings are usually much better in the last six months of the year than in the first six months.

Cotton Belt lumber traffic was formerly much more important proportionately than it is today. In fact, the Cotton Belt was originally built as a narrow gage lumber road. The lumber which at present makes up approximately one-quarter of the Cotton Belt's total tonnage originates on the line to White City, Tex., or, to be more exact, in the area in the neighborhood of Lufkin.

## Texas Lines Have Less Favorable Conditions

The Cotton Belt offers a third-morning delivery on manifest freight between St. Louis and Dallas and between St. Louis and Fort Worth in both directions. The distance is about 700 miles. Lumber is moved with a fourth-morning delivery at St. Louis. The road's passenger service is not of leading importance.

Some ideas of the road's maintenance standards are given in the facts that of the system's owned or leased mileage of 1,540, 201 miles is laid with 85-lb. rail; 864 with 75-lb.; 385, largely branch line mileage, with 56-lb., etc. At the end of 1921, 196 miles was ballasted with rock; 545 with gravel; 206 with burnt clay; 108 with cinders, and 485 was not ballasted.

The St. Louis Southwestern is in much better physical shape than the St. Louis Southwestern of Texas. The larger part of the 85-lb. rail is to be found on the former's main line, while the latter's main line still has 64 miles of 56-lb. The 206 miles of burnt clay ballast noted is all on the Texas lines, as is also the greater part of the 485 miles of the unballasted track mentioned. The Texas lines, of course, differ from the northern part of the system in that they fan out in a number of branches whereas the

northern lines are more in the nature of a main stem. Some indication of the differing characteristics is given in the manner of handling trains. Thus, a southbound train may leave East St. Louis with 4,000 tons and a limit of 100 cars. It operates over the Missouri Pacific Illinois division to Illmo, 125 miles. From Illmo to Pine Bluff, 275 miles and two freight districts, the rating is 3,400 tons. South of Pine Bluff to Texarkana this will be broken up into two trains each of 1,700 tons and beyond Texarkana, on the Texas lines, it is not possible to build the tonnage up again to the figure which permits more economical operation. The general situation is reflected in the operating statistics which may be reproduced in tabular form as follows:

OPERATING STATISTICS FOR 1921

| | St. Louis Southwestern | St. Louis Southwestern of Texas |
|---|---|---|
| Mileage | 946 | 807 |
| Net ton-miles | 1,095,426,000 | 367,835,000 |
| Freight cars per train | 42.5 | 24.1 |
| Net tons per train | 669 | 334 |
| Net tons per loaded car | 23.6 | 22.8 |
| Net ton-miles per train hour | 7,659 | 3,556 |
| Lb. coal per 1,000 gr. ton-miles | 124 | 245 |
| Net ton-miles per car per day | 395 | 271 |
| Car miles per car day | 24.5 | 18.7 |

The much less favorable conditions on the Texas lines are plainly evident. The situation might be even better summed up by reference to the net income of the two lines. In 1921, for example, the northern lines had a net after fixed charges of $3,941,055; the Texas lines, a deficit of $1,447,573. In 1920, the northern lines net was $4,942,787; the Texas lines deficit, $1,982,950. While it is true that these details reflect very unfavorable conditions on the Texas lines, it is also apparent that they emphasize how great is the earning power of the St. Louis Southwestern proper.

# Developments in the Railroad Labor Field

DEVELOPMENTS in the railroad labor situation in the first week of the new year presented conflicting indications of the future trend of events. In the main, however, these developments indicated the probable continuation of the peace which marked the closing days of 1922.

Hearings in disputes involving wages and working conditions of train service employees are scheduled to come before the Labor Board on January 15, but the scope and importance of these hearings has been considerably minimized during the past few weeks by the withdrawal of a number of the larger carriers involved, all of whom have been able to reach agreements with their train service employees. This development is taken by many as assurance that regardless of the outcome of these disputes there will be no serious consequences therefrom, during the present year at least.

Just prior to the close of 1922, E. J. Manion, president of the Order of Railway Telegraphers, predicted a strike on 11 western railroads unless the Labor Board acted favorably on the petition of that organization for a re-hearing on the decision of the board which was announced in December and reported in the *Railway Age* of December 16, page 1130. At that time Mr. Manion said he had appealed to President Harding to intercede in behalf of the telegraphers on the grounds that the Labor Board had been repudiated and that the President himself had suggested its abolition. Mr. Manion contended that the board's decision, which adjusted certain inequalities in the pay of telegraphers, was, in reality, a "reduction for all operators on the 11 roads when wages on other lines of employment were being advanced."

The telegraphers have filed a petition for a re-hearing with the board but so far no action has been taken upon it and to all appearances, at least, no further action has been taken by the organization.

### Federal Court Upholds Daugherty Injunction

The famous Daugherty injunction, enjoining railway shopmen on strike with interferring with train operation, will continue in effect at least until May 2, under a ruling handed down at the beginning of the year by Judge James H. Wilkerson of the United States District court at Chicago. Counsel for the striking shopmen had urged that, since the strike is over and the men have returned to work, the writ should be annulled.

"The bill certainly charges a combination and conspiracy to do acts which are unlawful in themselves and which, by reason of their inherent nature, prejudice the public interests by unduly restricting competition or unduly obstructing the course of trade," Judge Wilkerson held.

"The arguments of the defendants that the bill, if its scope is thus narrowed, becomes merely a bill to enjoin the commission of crimes, overlooks the provisions of the Sherman and Clayton laws, which invest the district courts with jurisdiction to prevent and restrain violations of these laws."

The defendants' construction of Section 20 of the Clayton act, Judge Wilkerson said, would confer immunity upon unlawful acts in a labor controversy, "even though back of that controversy there was a conspiracy to overthrow the government itself."

The final hearing, which will decide whether the injunction shall be made permanent, was fixed for May 2. Judge Wilkerson declined to rule whether a jury will pass on the question. The demand for a jury trial should properly be raised when the final hearing begins, he said.

### The Truth About Violations of Labor Board Orders

The constant reiteration of the charge that the railroads have constantly violated provisions of the Labor Board and have consequently placed themselves in the same position as the shopmen who struck against a ruling by that body, led Ben W. Hooper, chairman of the board, to issue a statement recently outlining the results of a careful check of the board's records on this subject. He said in part:

The Railroad Labor Board has received many inquiries in regard to the number of violations of its decisions. The people are apparently anxious to ascertain the extent to which the decisions of the Board, without the sanction of a penalty, have been respected by the parties. A careful check of our records shows the facts set out below:

From April 15, 1920, to December 15, 1922, the full period of the Board's operations, 11,414 disputed questions were referred to it. Of these, 9,244 have been disposed of. Of the total number of disputes, 961 did not reach the status of regularly docketed cases.

The cases regularly docketed, as in a court, numbered 10,453. Of these, 8,534 have been disposed of. Many of these cases, involving the same general questions of wages and rules, were consolidated under one docket and decision number.

There are in the United States 201 Class I railroads and 892 short lines. Of the Class I carriers, 58, and of the short lines and miscellaneous companies 56, are alleged to have violated decisions of the Board.

The violations that have occurred on the short lines affect a comparatively small number of men, but involve the same principles as those on the large railroads.

On the Class I roads there have occurred 61 cases in which the Board has formally held that its decisions have been violated. Of these, 46 are comprised in the so-called "contract" cases, in which the carriers let to contractors, independent or claimed-to-be independent, the work of certain classes of their employees. These cases can hardly be characterized as direct and unquestioned violations of the Board's decisions, inasmuch as the contracts were entered into under a claim of right, and the legal question involved is now before the federal courts from one road. It must also be noted that, after the Board decided that such contracts could not operate to arbitrarily change the established rules and wages of the employees, all but a few of the railroads implicated withdrew from their contracts. If, in view of these facts, these 46 contracting cases be omitted from the 61 cases in which the Board has declared violations, there will remain 15 violations on Class I

roads. As to this remaining number, a considerable portion of the roads have complied with the Board's adverse decision. Just how many roads have not done so, the Board is not fully informed. One case from the Pennsylvania Railroad is involved in a lawsuit in which the carrier attacks the Board's decision.

In the Atlanta, Birmingham & Atlantic case, the violation of the Board's decision, consisting of a wage reduction by the receiver, was authorized by a federal court.

In addition to those cases wherein the Board has formally held its decisions to have been violated, there are 76 cases pending before the Board in which it is charged that Class I carriers have violated decisions, but upon which charges the Board has not yet taken action. Many of these are contested by the carriers and a majority of them have been heard.

A large percentage of the alleged violations involve unauthorized reductions of wages and unauthorized changes in rules. In cases complaining of such wage reductions, the Board has decided 7 in favor of the employees and 1 in favor of the carrier. In cases complaining of arbitrary changes in rules, the Board has rendered 10 decisions upholding the employees and 2 sustaining the carriers. Only two of the Board's decisions have been attacked in the courts, in both cases by the carriers.

In only one instance to my knowledge, has an employee gone into court to assert his rights under a decision of the Board. In that case, the Supreme Court of Mississippi gave judgment in favor of the employee and upheld the Board's decision.

There have been no violations of the Board's decisions by employees, unless the shop strike and the Missouri & North Arkansas strike should be so accounted. In the shop strike, however, it must be remembered, that the shopmen did not accept the Board's decision, and consequently claimed that they did not violate it but exercised their legal right to reject it.

The strike on the Missouri & North Arkansas might be classed as a violation of the Board's decision, but the employees claim that the carrier in the first instance violated a decision, and that they, in the second instance, declined to accept one.

Let me cap these naked facts and figures with two conclusions: First, the Board's decisions have been respected by both parties to a degree that is remarkable, in view of the great number of decisions and the trying and unsettled period through which the railroad industry has been passing. Second, the enforceability of the decisions of this Board or any tribunal of similar jurisdiction is more desirable for the protection of the rights of the employees than for any other purpose.

# Report on Collision at Adeline, Louisiana

THE Interstate Commerce Commission has issued a report, dated November 29 and signed by W. P. Borland, chief of the Bureau of Safety, on a collision which occurred on the Southern Pacific Lines at Adeline, La., on October 31 last, when three passengers were killed and 17 were injured. These passengers were employees of a circus. The damage to cars and engines amounted to $18,549. The circus train, moving westward, about 3:15 A. M., was run into by a following passenger train, No. 109. The rear car of the circus train was crushed, telescoping the car ahead of it, and the third car from the rear also was telescoped by the fourth car, for a distance of about 22 ft. Train 109 was not derailed and was not much damaged.

Adeline is 109 miles west of New Orleans. The line is double-track but no block signal system was in use.

The circus train was running as the first section of freight train No. 241 and consisted of 25 freight cars and 10 sleeping cars, besides a car at the rear, a chair car, used as a caboose. The eleven passenger cars were all wooden. Because of a shortage of trainmen at the eastern terminus of the line, Algiers, La., all of the brakemen on the circus train were inexperienced in road service. At Baldwin, four miles east of Adeline, the engineman of the circus train prepared to back his train off on the eastbound track to clear the way for the passenger train; but receiving no response to his back-up signal and receiving instead repeated proceed signals, he continued toward Adeline. He did not recall the flagman, for he knew that No. 109 was nearly due and supposed the flagman would remain out to stop that train. The flagman, however, came in, leaving a fusee, but no torpedoes. The reasons advanced by Conductor Adams of the circus train for leaving Baldwin only one minute ahead of the scheduled time of No. 109 were that he could see back two or three miles and the passenger train was not in sight; that that train was probably a little late and that he could go to Jeanerette, five miles beyond Adeline, being able to run as fast as No. 109. When the engineman slackened his speed at Adeline (to back off), Conductor Adams, finding that the flagman had not thrown off fusees, told him to hurry back; but it was then too late to do any good. It was then foggy at Adeline, although there had been no fog at Baldwin when the train was there. The flagman had no time table and no standard watch.

The inspector holds Conductor Adams primarily responsible for the collision, declaring that he was grossly careless. At Baldwin, he deliberately disregarded the requirement of the rule to keep five minutes clear of superior trains. The report quotes the testimony of all concerned at considerable length, but there are numerous discrepancies which it does not attempt to clear up. The conductor evidently approved the disregard of rule 99 by the flagman. The flagman apparently knew the flagging rules, yet he neglected to throw off fusees.

Circus trains, usually composed of wooden passenger cars, require special care and, lacking a crew of the necessary experience, a trainmaster or other competent operating officer should have been assigned to the train, says the inspector. From Baldwin, the engineman of No. 109, although he stopped and waited for the fusee to burn out, felt warranted in assuming that the road was clear; for another westbound freight was standing on the eastbound track and he naturally assumed that the fusee had been placed by the flagman of that train. The report calls attention to the need of the block system on this line.

**Collision at Adeline, Louisiana, October 31, 1922; Three Killed, 17 Injured**

# Graphic Presentation of Boiler Proportions

## A Diagrammatic Method for Showing at a Glance the Essential Facts Brought Out by Cole's Ratios

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THE WRITER recently found it desirable to show graphically the relation between the basic coal burning rate, the boiler heating surface and the cylinder horsepower of locomotives and has developed a composite diagram which has proved very satisfactory in showing these relationships at a glance. The diagram is based on the methods and data proposed by F. J. Cole and in effect is a graphic presentation of the so-called Cole's Ratios.

There are certain fundamental facts which must be kept in mind in order to make this diagram clear and adaptable to any locality. The first is the character of fuel. Grafton Greenough, at the last convention of the Mechanical division of the A. R. A., called attention to the fact that the Consolidation type locomotive is adaptable on certain railroads because of having a fuel of high calorific value. Not all coal has 14,000 B.t.u. value and the lower grades are often accompanied by undue proportions of ash which may also possess clinker forming characteristics. As coal of 14,000 B.t.u. is taken as the basis of these calculations, the character of the fuel actually to be used should be taken into consideration in applying deductions from the diagrams as to heating surface performance and horsepower developed.

As compared with cylinder horsepower the boiler may be 100 per cent, but the performance will not be 100 per cent if the rate of combustion is, say 180 lb. per sq. ft. of grate per hour. A coal burning rate of 120 lb. is fixed as the maximum for economical evaporation, which is probably true for the majority of locomotive coals. The character of the service should also be considered in this connection. Long sustained grades or long levels lend an opportunity for a closer estimate of proportions than where choppy conditions are prevalent all over the railroad.

The heating surfaces of a locomotive boiler are those of the firebox and the tubes and flues. Both are measured in square feet, although their relative evaporation value compares approximately as six to one. Roughly then, if we divide the tube and flue heating surfaces by six and add the result to the firebox heating surface we have an expression of the total equated heating surface in terms of a common rate of evaporation, which has been taken as 55 lb. of water per sq. ft. of heating surface. In the actual determination of this factor, the size, length and spacing of the flues must be taken into account.

From the results of various tests, which have generally been considered as authoritative, it has been found that if the steam is used directly as evaporated in a locomotive boiler, it will be consumed at the rate of 27 lb. per horsepower hour. If superheated in accordance with usual locomotive practice, it will be used at the rate of 20.8 lb. These figures are used in the boiler horsepower calculations for the diagrams. The total amount of water used per hour divided by the 55-lb. rate of evaporation per hour will give the total equated heating surface for a theoretically 100 per cent boiler, based on a burning rate of 120 lb. of coal per sq. ft. of grate per hour.

We now have data for the base or comparison line *A* of the diagrams, with columns at the left for writing in the coal rate, the grate area of the boiler in question and percentages of the basic rate of burning. Line *A* represents a 100 per cent relationship of boiler to grate. At the right are columns for the equated heating surface and the boiler horsepower.

On a predetermined scale line *B* is located, showing the equated heating surface and boiler horsepower of the locomotive in question, for the combined firebox, combustion chamber, tubes and flues. This may fall above or below line *A*, depending on the equated heating surface proportions. Line *C* represents the addition of the heating surface of the arch tubes.

In addition to these lines, a short line and arrow point indicates the cylinder horsepower on the boiler horsepower scale and below the generally used percentages are written in. The percentages on the left are based on the theoretical boiler line *A* and are used mainly in the computations.

Figs. 1 to 12 are diagrams developed from the dimensions of the various United States Railroad Administration locomotive designs. Undoubtedly some of the features in these designs represented by differences in the diagrams are the results of the effort for standardization. For instance, there are seven sizes of grates for the twelve designs and six types, and in the case of the heavy 4-8-2 and light 2-10-2 types, the boilers are identical, giving a large grate and low burning rate for the later design.

Of the freight types, the heavy Mikado and the light 2-10-2 types are very consistent examples of good design with reserve boiler horsepower and a low burning rate to care for poor coal and indifferent firing or boiler conditions. The heavy 2-10-2, while showing less reserve, actually has it in a lower burning rate.

The horsepower for the Mallets was not calculated, but approximated to that of simple engines of like tractive effort. The diagrams are interesting in that they show the relatively small grate on the 2-6-6-2 type and the relatively large grate on the 2-8-8-2 type.

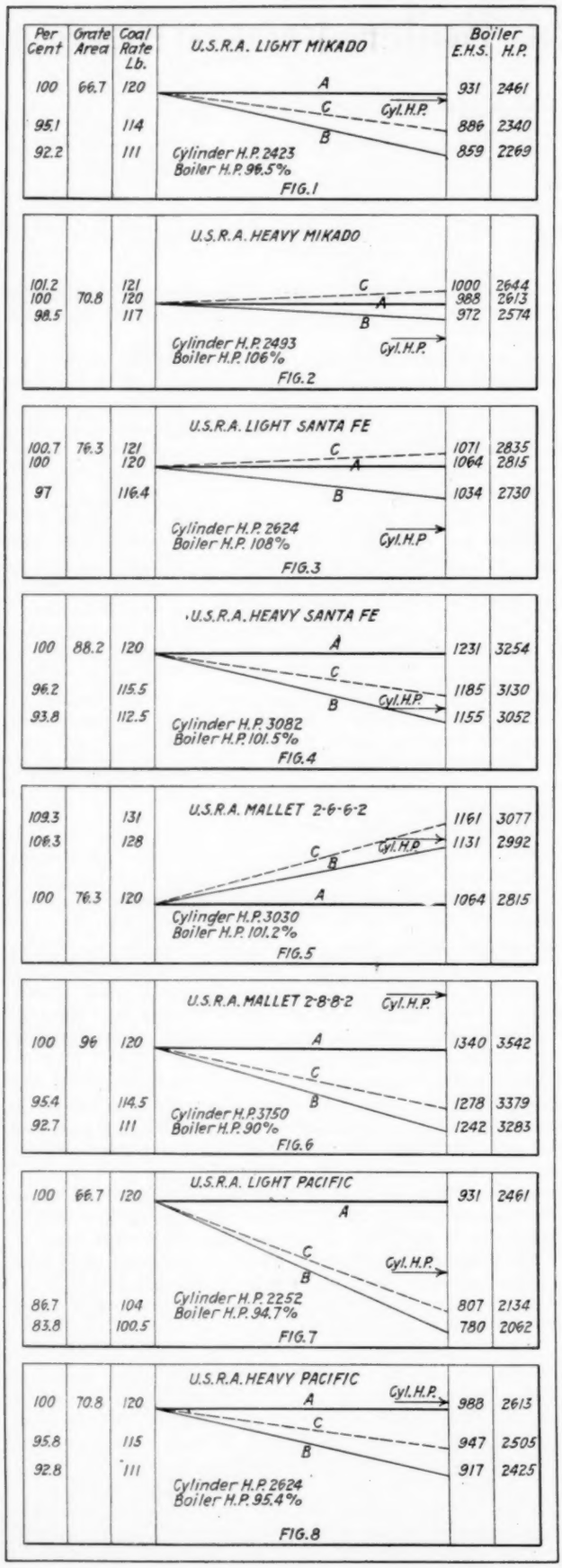
Of the passenger engine types, it will be noted that the light Pacific and light Mountain types have about the same boiler ratio to cylinder horsepower, but the advantage lies with the Pacific on account of the ample grate and low burning rate, although the Mountain type is not at all beyond the range of good proportions. The heavy Mountain type has somewhat more reserve heating surface and is practically at par with the 100 per cent theoretical line.

The switcher designs show what is considered good practice for boilers in switching service in the 0-6-0 design and somewhat more liberal boiler proportions for the 0-8-0 type, fitting it for transfer service.

The designs of the U. S. R. A. engines did not take into consideration the use of Thermic syphons, which were then in the development stage, but arches and arch tubes were used on all designs and all were superheated. The evaporative value of the arch tube heating surface, averaging about 30 sq. ft., is well shown in the diagrams.

The effect of syphons in increasing the heating surface in the most effective location and in generally stimulating evaporation by the circulation of the water in the boiler is shown in the diagrams on the following basis.

Records of many road tests on a number of railroads in all sections and in all classes of service show coal savings of



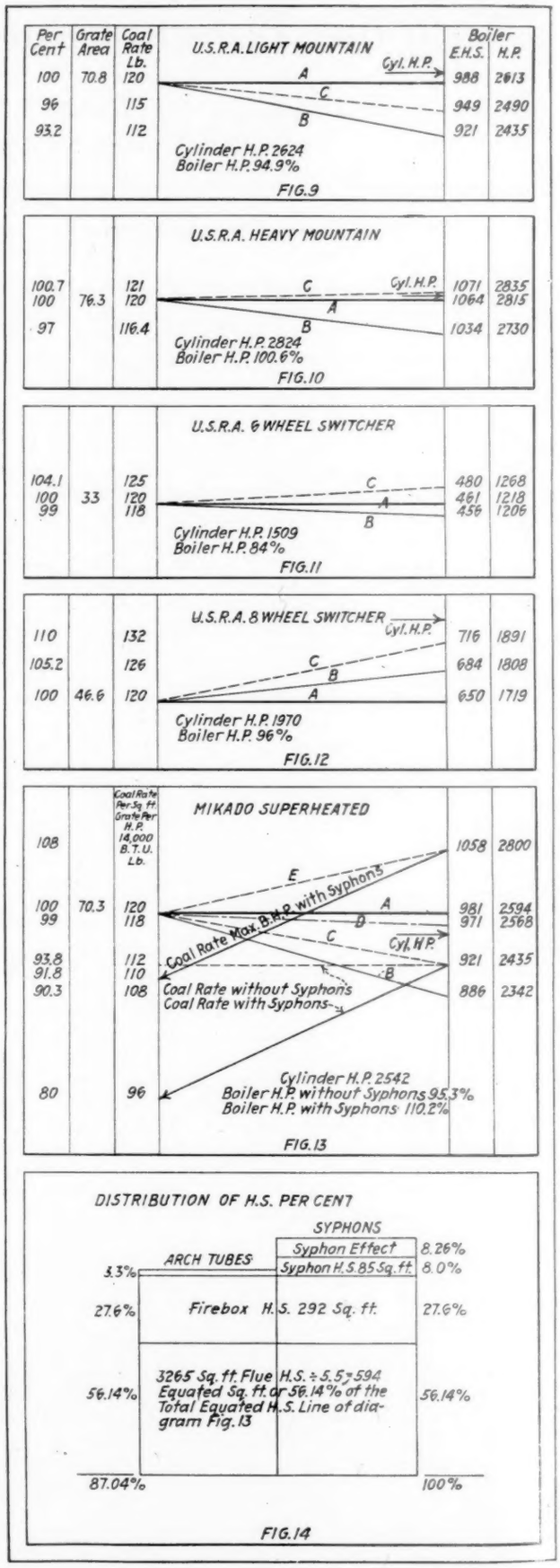


Per Cent | Grate Area | Coal Rate Lb. | Boiler E.H.S. | Boiler H.P.
U.S.R.A. LIGHT MOUNTAIN
100 70.8 120 988 2813
96 115 949 2490
93.2 112 921 2435
Cylinder H.P. 2624
Boiler H.P. 94.9%
FIG. 9
U.S.R.A. HEAVY MOUNTAIN
100.7 121 1071 2835
100 76.3 120 1064 2815
97 116.4 1034 2730
Cylinder H.P. 2824
Boiler H.P. 100.6%
FIG. 10
U.S.R.A. 6 WHEEL SWITCHER
104.1 125 480 1268
100 33 120 461 1218
99 118 456 1206
Cylinder H.P. 1509
Boiler H.P. 84%
FIG. 11
U.S.R.A. 8 WHEEL SWITCHER
110 132 716 1891
105.2 126 684 1808
100 46.6 120 650 1719
Cylinder H.P. 1970
Boiler H.P. 96%
FIG. 12
MIKADO SUPERHEATED
Coal Rate Per Sq. ft. Grate Per H.P. 14,000 B.T.U. Lb.
108 1058 2800
100 70.3 120 981 2594
99 118 971 2568
93.8 112 921 2435
91.8 110
90.3 108 886 2342
80 96
Coal Rate Max. B.H.P. with Syphons
Coal Rate without Syphons
Coal Rate with Syphons
Cylinder H.P. 2542
Boiler H.P. without Syphons 95.3%
Boiler H.P. with Syphons 110.2%
FIG. 13
DISTRIBUTION OF H.S. PER CENT
SYPHONS
Syphon Effect 8.26%
ARCH TUBES
Syphon H.S. 85 Sq. ft. 8.0%
3.3%
27.6% Firebox H.S. 292 Sq. ft. 27.6%
56.14% 3265 Sq. ft. Flue H.S. ÷ 5.5 = 594 Equated Sq. ft. or 56.14% of the Total Equated H.S. Line of diagram Fig. 13 56.14%
87.04%
100%
FIG. 14

**Fig. 1 to Fig. 12 Inclusive Show Proportions for U. S. R. A. Standard Locomotives. Fig. 12 and Fig. 13 Show Effect of Adding Thermic Syphon**

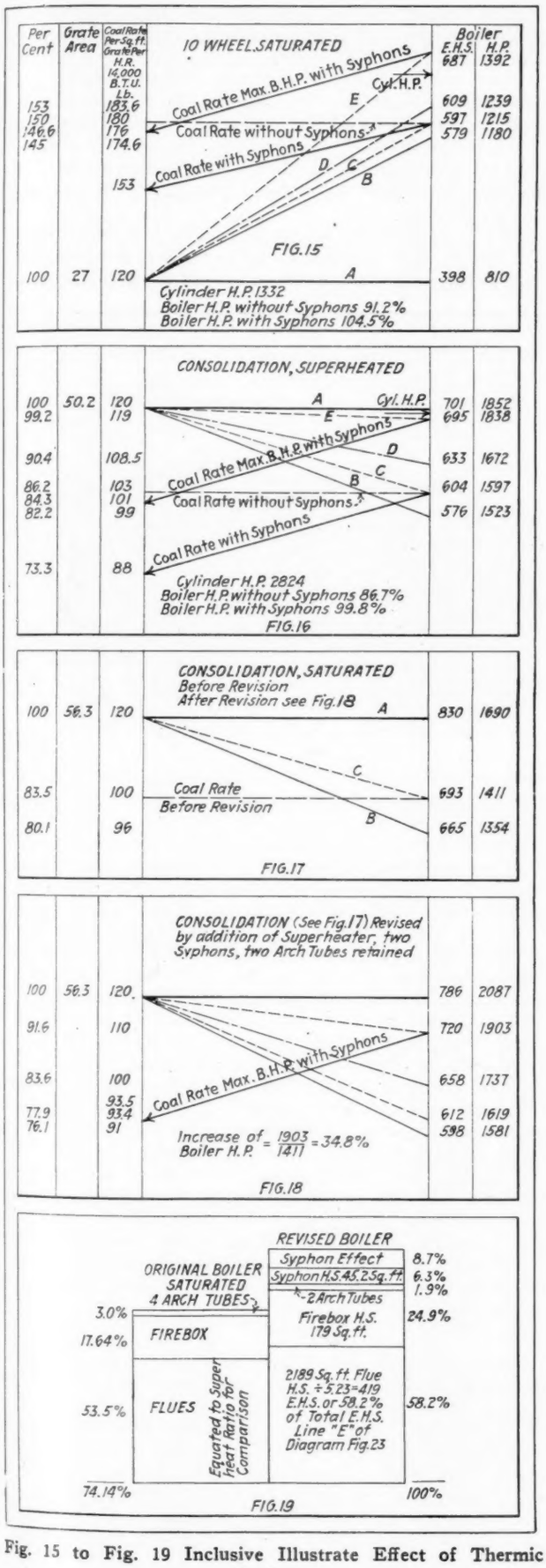



**Fig. 15 to Fig. 19 Inclusive Illustrate Effect of Thermic Syphon**

syphon-equipped locomotives over engines of the same class equipped with arch tubes, running from 12 per cent to 25 per cent and over per 1,000 adjusted ton-miles. Eliminating the high figures, the grand average is an 18 per cent coal saving. For a conservative figure that can be realized in regular service, this has been further reduced to 15 per cent.

In the diagrams shown in Figs. 13 to 19, the *A*, *B* and *C* lines are for the same purposes as in the previous diagrams. Line *D* shows the effect of syphon heating surface and is obtained by deducting the arch tube heating surface and substituting the syphon heating surface actually added to the firebox. Line *E* represents the syphon effect and is derived by assuming that instead of saving the coal, the extra amount is burned and used to develop added power. Then the additional horsepower and equivalent equated heating surface amounts to an addition of about 15 per cent to the amount shown by line *C*, the arch tube equivalent performance.

The heavy diagonal lines show the combustion rates with syphons for the maximum boiler horsepower and for the original maximum horsepower with the arch tubes. By reading horizontally across the diagram the rate of combustion without syphons is shown.

Fig. 13 shows a typical design of Mikado type boiler which rates at 95 per cent of the cylinder horsepower, indicated by the arrow-point above line *C*. Application of syphons with 85 sq. ft. of heating surface produces the conditions shown by line *D*, which is above the cylinder horsepower in actual equated heating surface value on the basis of the standard rate of evaporation. Horizontally opposite this point will be found a 118-lb. combustion rate, 99 per cent of the assumed standard of 120 lb. But the ground for a 15 per cent coal saving has already been laid, which would reduce the rate to about 100 lb. If, instead of saving this amount, it is burned in order to obtain maximum boiler horsepower output, the result is shown by line *E*, located 15 per cent higher at the right than line *C*, which shows the arch tube engine proportions. The rate of combustion for this amount of power, which may or may not be usable, is shown by the upper diagonal line and the rate for the maximum boiler horsepower before syphons were applied is shown by the lower diagonal line to be 96 lb.

Thus, it will be seen that the diagram to and including line *D* is built on actual facts as derived from established engineering data, while line *E* is based on a conservative assumption of the syphon rate, brought about by (a) an actual heating surface addition of about 8 per cent of the total equated heating surface and (b) by the syphon effect on boiler water circulation and the higher evaporative value of syphon heating surfaces as compared with the average equated figure. Fig. 14 is the distribution of the heating surface in percentage proportions, taking the total equated heating surface of Fig. 13 as 100 per cent, showing a relation of 87.04 per cent for the boiler before syphons were applied.

There are many locomotives now in service having deep, narrow fire-boxes with a high ratio of heating surface to grate area. They may have weight and high cylinder horsepower much hampered by the small grate and excessive combustion rate. Fig. 15 shows the effect of adding the syphon to an engine with 27 sq. ft. of grate area calling for a 180-lb. combustion rate to develop 91 per cent of the cylinder horsepower.

Fig. 16 shows an opposite case of ample grate and low burning rate but limited heating surface to develop the cylinder horsepower. In this diagram the total equated heating surface brings up the boiler practically to the theoretical 100 per cent.

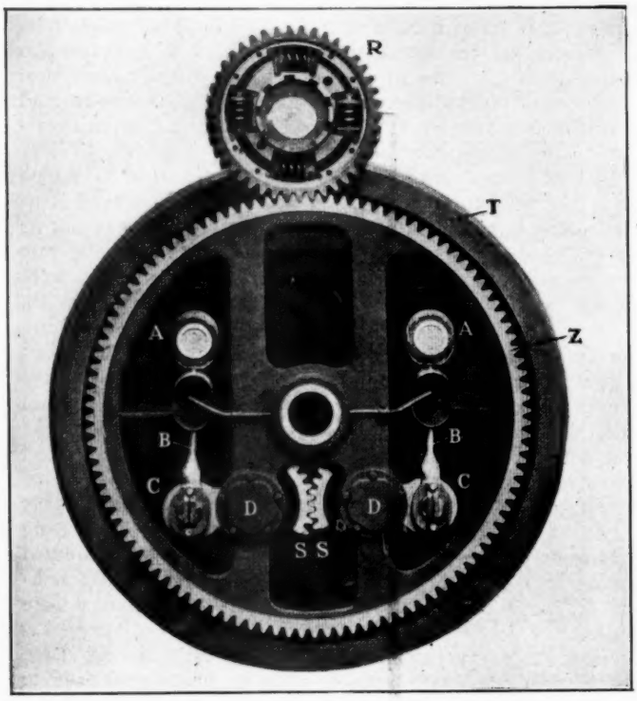
Fig. 17 shows the proportions of a Consolidation type locomotive originally heavily built and capable of a considerable increase in tractive effort by cylinder and steam pressure changes. The original boiler was saturated and

carried four arch tubes with a rating of 1,411 boiler horsepower. The boiler revision consisted of superheating, adding two syphons and retaining two arch tubes. The combined effect has been to give an equated heating surface of 720 sq. ft. or 1,903 boiler horsepower, an increase of 35 per cent, with a very moderate coal rate, as shown in Fig. 18. In Fig. 19 is shown the distribution in percentage of the heating surfaces and the factors contributing to the results with the revised design, as compared with the original dimensions equated to the superheat ratio for comparison.

The revised engine has successfully handled an increase of 20 per cent and over of the tonnage rating of the original design.

# Unique Drive for Electric Locomotives

A MECHANICAL connection between the motors and driving wheels of an electric locomotive, known as the Brown Boveri individual axle drive, has been developed by Brown Boveri & Co., Baden, Switzerland. Eight locomotives equipped with this drive have now been in service for nearly a year on the St. Gotthard line of the Swiss Federal Railways with apparently satisfactory results. The locomotives have a 4-6-2 wheel arrangement and have one-



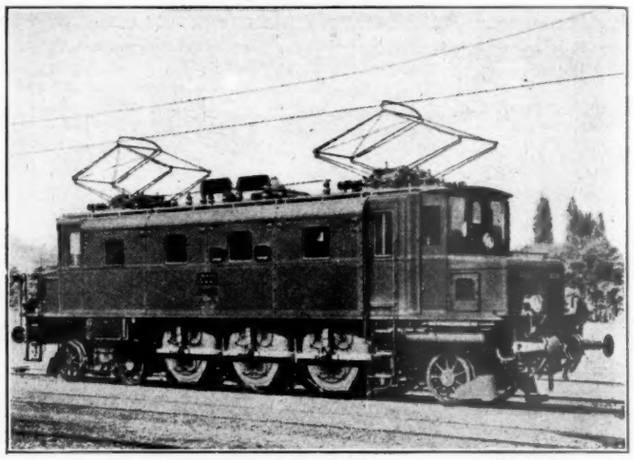

**Pinion, Gear and Driving Wheel as Assembled in the Individual Axle Drive**

hour and continuous ratings of 2100 hp. and 1740 hp., respectively. They will develop a maximum tractive effort of 30,000 lb. and a continuous tractive effort of 15,000 lb. The driving wheels are 63½ in. in diameter and the total weight of the locomotive is 91.5 metric tons, or approximately 200,000 lb.

Prior to its use on the St. Gotthard line the Brown Boveri individual drive was tried out experimentally on the Lötchsberg Railway for over three years, where it gave very satisfactory results. The only change that was made to the drive as applied to the new locomotives was that it was made somewhat heavier, a spring hub for the pinion was added and also a mechanical lubricator for the drive.

The upper half of the gear casing shown in Fig. 1 is very heavy, is mounted rigidly on the frame and supports the pin on which the gear rotates. The motor, motor pinion and gear are all centered rigidly on the locomotive frame. The pinion has a spring hub; the coil springs, Fig. 2, provide a cushioning effect in rotation, but do not permit the periphery of the pinion to change its distance from the center of the motor shaft.

The top half of the gear case, which is bolted to the main frames, is so constructed as to carry a third bearing for the motor rotor shaft on the outside of the pinion, in ad-



**Swiss Locomotive with Individual Axle Drive**

dition to the pin upon which the gear wheel turns freely. In order to obtain a satisfactory gear ratio (1: 2.57) the gear wheel is set somewhat higher than the driving wheel centers, the actual difference being about 1 in.

The torque from the gear is transmitted to the driving wheel by a coupling device, which is elastic in all directions, consisting of a system of levers mounted on the center part of the gear wheel. There are two pins, *A*, Fig. 2, on the driving wheel to which are attached two rods, *B*, having spherical bearings which allow sufficient freedom of movement between driving and gear wheels. The other ends of these are forked and form knuckle joints at *C* with the toothed segments, *S*, which oscillate about the pins *D* mounted on the gear center. This arrangement permits of free vertical and lateral displacement of the drivers relative to the frame and it is also possible for them to adapt themselves to a curve, as when, for example, the pony and leading driving wheels are combined in a Helmsholtz truck.

All the gears are carried on one side of the locomotive, and to balance this the auxiliary apparatus has been placed on the opposite side of the cab. This would not be essential in a locomotive having an even number of drivers, but has the advantage of permitting a wide passage from end to end of the cab, without curtailing accessibility of either motors or auxiliary apparatus.

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DINING CARS with papered walls are now being operated by the Chicago, Burlington & Quincy on many of the trains out of Chicago. After two years of investigation, a type of wall paper was invented which would adhere to the steel sides of the cars. The paper used is in dull tones with inconspicuous figures and is said to create a more homelike atmosphere in the cars. The paper can be readily cleaned of the grime which accumulates in the course of use and can be replaced inexpensively. These are said to be the first cars in general service to be decorated with wall paper.

# Van Sweringens Acquire C. & O. Stock Interest

## Announcement Made on Monday of Purchase of H. E. Huntington's Holdings

THE VAN SWERINGEN interests of Cleveland, who at present are in control of the New York, Chicago & St. Louis, the Toledo, St. Louis & Western and the Lake Erie & Western, have secured in addition a large interest in Chesapeake & Ohio through the purchase from H. E. Huntington and his associates of their holdings in the latter company. Reports that the Van Sweringens had

O. P. Van Sweringen

M. J. Van Sweringen

secured an option for the purchase of this stock have been current for two or three weeks. Confirmation that the option had been exercised was forthcoming on Monday when it was learned that O. P. Van Sweringen, chairman of the New York, Chicago & St. Louis, and M. J. Van Sweringen, J. J. Bernet, Otto Miller and J. R. Nutt, all officers or directors of the N. Y., C. & St. L., had filed applications with the Interstate Commerce Commission for authority under the terms of Section 20a of the Interstate Commerce Act to become directors of the Chesapeake & Ohio and its subsidiary companies if and when they shall be elected.

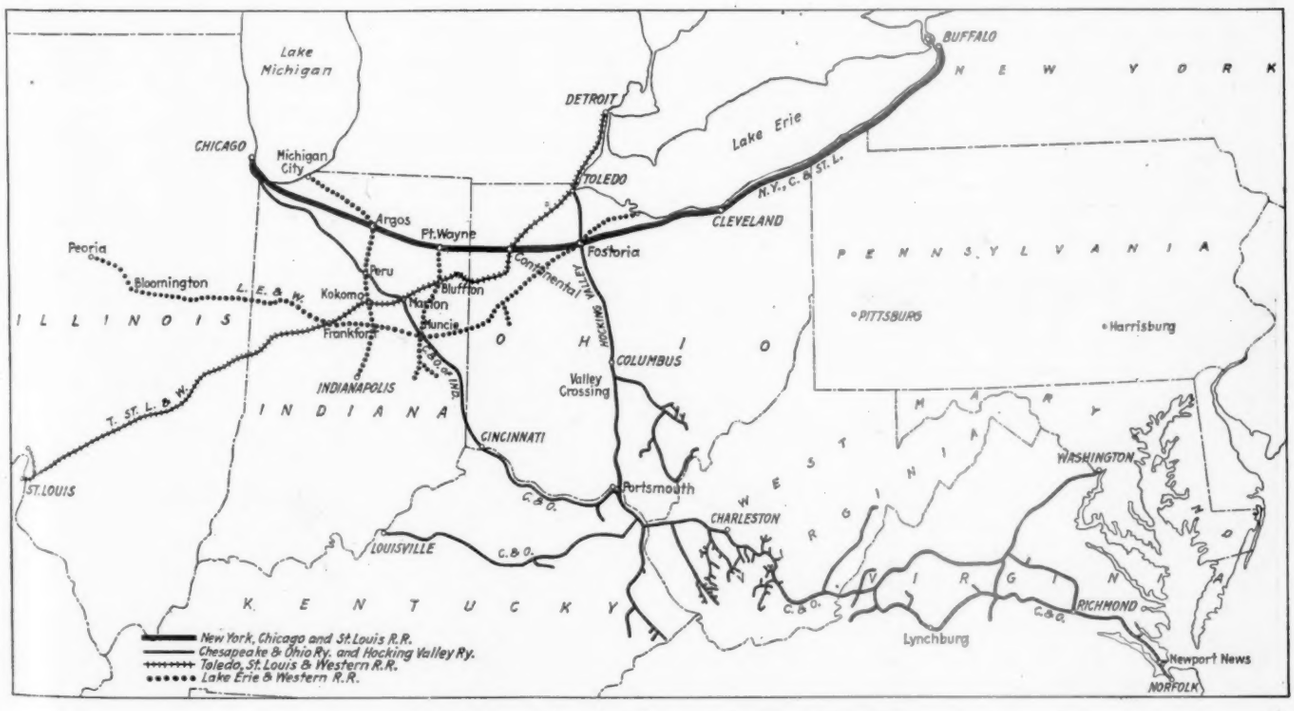
Further confirmation was contained in a statement given out by O. P. Van Sweringen in Cleveland, which said simply:

"The report from Washington to the effect that ourselves and associates have made application to the Interstate Commerce Commission to serve on the board of the Chesapeake & Ohio and its lines is correct.

"We have secured from the Huntingtons and their associates contracts for delivery of their stock holdings in these properties."

This acquisition by the Van Sweringens is the largest step which the two brothers—O. P. and M. J. Van Sweringen—have yet taken in what is apparently a process of building up a new railroad system serving the important industrial centers between Chicago, St. Louis and the East. The building up process has been under way since last March, when there was acquired the Toledo, St. Louis & Western, or Clover Leaf, which gave the Nickel Plate—the parent company—an excellent outlet to St. Louis. In July, the Lake Erie & Western was acquired from the New York Central. This road supplements the two other lines by giving them feeder lines serving lucrative territory in Illinois, Indiana and Ohio, besides which it supplies an important connection with various western lines at Peoria, Ill., thereby avoiding the congested Chicago terminals.

Announcement has recently been made that it is the plan of the Van Sweringens to merge these three lines into one company. This company would have a mileage of 1,669, of which 1,225 is included in the at present combined Nickel




**Lines Composing the Van Sweringen "System"**

Plate and Lake Erie & Western and 444 in the at present separately operated Clover Leaf.

The announcement made from Cleveland on Monday and the application to the I. C. C. relative to the directorships alike gave no details concerning the amount of C. & O. stock which the Van Sweringens are to secure. In the absence of more definite details it seems to be generally accepted, however, that the holdings of Mr. Huntington and his associates amount to about 30 per cent of the total shares outstanding. If this assumption is correct, the Cleveland financiers will not have a majority control, but they will have enough of a control to exercise a very strong influence in C. & O. affairs. Whether it is the intention of the Van Sweringens to merge the Chesapeake & Ohio and its controlled Hocking Valley into the present Nickel Plate system it is impossible to say. There are reports that the C. & O. purchase may be only a speculation, but the fact that J. J. Bernet, president of the Nickel Plate, is to become a director of C. & O. makes observers believe that the purchase is a Nickel Plate purchase as much as a Van Sweringen purchase. In other words, it is presumed that a union of the properties is included in the Van Sweringen contemplations.

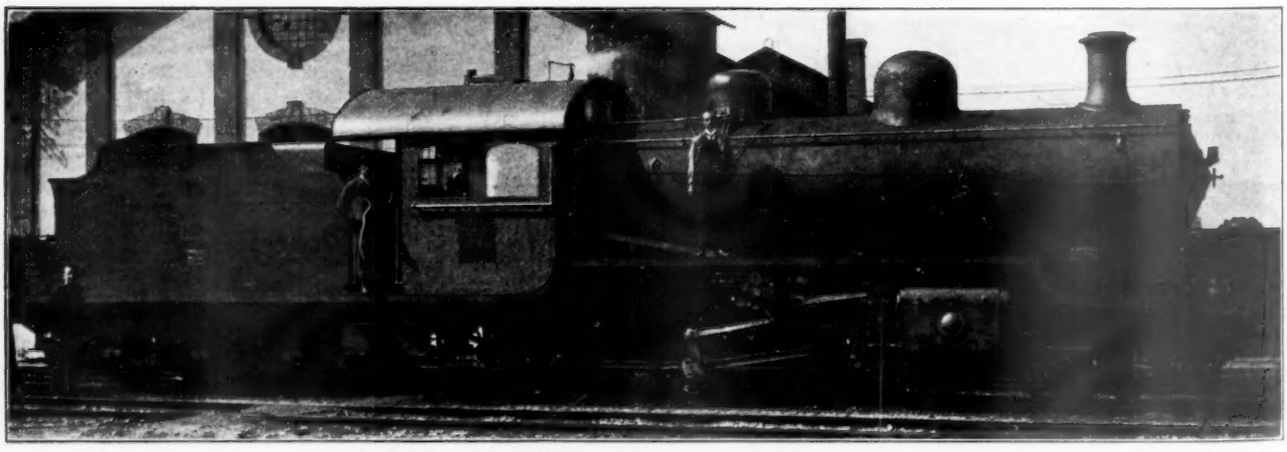
The Chesapeake & Ohio's mileage totals 2,551 and that of the Hocking Valley an additional 345, a total of 2,896 which compares with the mileage at present owned by the Van Sweringens of 1,669. This shows the importance of the step which has been taken in acquiring Mr. Huntington's stock as it nearly triples the present Van Sweringen mileage. As the *Railway Age* noted in its issue of December 30, page 1217, it is difficult to see what the Van Sweringens may have in mind in acquiring C. & O. The characteristics of the present system differ widely from those of the Chesapeake & Ohio, and on the whole, the two lines seem to be neither competitive nor complementary. The specialty of the Nickel Plate lines is their fast freight service which moves east and west, a large share of it being interchange business at Buffalo. The Chesapeake & Ohio's specialty is coal which moves from the rich Kanawha, Logan and New River fields east to tidewater at Newport News and west and north over the Hocking Valley to Toledo. The Nickel Plate has been held to need an eastern outlet, but it needs this outlet at Buffalo and it is difficult to see wherein the Chesapeake & Ohio may prove of value from that point of view. It has also been suggested that the Nickel Plate would be benefited by having a line entering the coal fields. This, of course, the Chesapeake & Ohio does, but the acquisition of the C. & O. for that purpose alone seems to be a step much out of proportion to the desired results.

The Chesapeake & Ohio itself has no connection with the Nickel Plate. The Chesapeake & Ohio of Indiana, however, connects with the Nickel Plate at Chicago via the Belt Railway. It connects also with the Clover Leaf at Marion, Ind., and with the Lake Erie & Western at both Muncie and Peru, Ind. The Hocking Valley at Toledo connects with the Clover Leaf and at Fostoria three Van Sweringen lines will come together, the Hocking Valley, the Nickel Plate and the Lake Erie & Western. None of these connections represent really important traffic routes between the Nickel Plate and C. & O., and none bear any comparison to the importance of the connection, for example, at Continental, Ohio, between Nickel Plate and Clover Leaf, which is the point through which passes the Buffalo-St. Louis traffic which is so important a feature of Nickel Plate operations.

The Chesapeake & Ohio should, however, prove a very valuable adjunct in other ways even if not from a traffic standpoint. It may, of course, prove of great value from that standpoint also, although to form an intelligent opinion on that point it will be necessary to have considerably more information about the Van Sweringen plans than is at present available. The Chesapeake & Ohio itself is expanding rapidly, as is evidenced by the elaborate plans which have been announced as regards contemplated improvements in 1923. Its assets are primarily embodied in its favorable cutlets both east and west, in its favorable grade line, in the value of the coal fields served, etc. It suffers from one factor, which is that, if anything, the expansion of the coal fields has been somewhat ahead of the expansion of the rest of the railroad. That the present management realizes this is indicated in the work already done, or planned in 1923, to provide new yards, sidings, terminals, etc.

The road found 1922 a fairly prosperous year. Between April 1 and July 1, it carried almost a record-breaking traffic in non-union coal, and in June it reported a net railway operating income of $2,452,539. The shopmen's strike was a rather severe set-back and the situation was particularly complicated on the Chesapeake & Ohio, because there was at the same time a walk-out of the clerks. The road's net railway operating income for the first ten months of the year was $12,293,935, which compared with $11,063,383 in the first ten months of 1921. The maintenance of equipment costs during the past two or three months have been much above those of the same months last year, but as will be evident, this was compensated for by the favorable results prior to the shop strike and notably in June.

The Hocking Valley, which is the C. & O.'s outlet to the west and from which the C. & O. has received a good return in dividends, has thus far done better comparatively than the C. & O. Its own mines were idle during the coal strike, but it was assisted by the business turned over to it by the C. & O. Its net railway operating income for the first ten months of 1922 was $1,937,238 which compared with $829,357 for the same period last year.



**A Serbian Freight Locomotive**

# Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING from January 1 to December 30, 1922, amounted to 43,713,519 cars, as compared with 39,323,158 in 1921, 45,118,472 in 1920, 42,180,328 in 1919 and 44,755,041 in 1918. This represented an increase of 11 per cent as compared with 1921 and while the total was below that of 1920 or 1918 the loading of all commodities except coal exceeded that of any previous year—36,000,000 as compared with 31,000,000 in 1921 and 35,000,000 in 1920.

The loading of grain and grain products, livestock and merchandise, l.c.l. also exceeded that for 1921 and 1920, while coke, forest products, ore and miscellaneous freight exceeded 1921 but were less than for 1920. However, the loading of merchandise and miscellaneous freight combined exceeded that for any previous year. Coal was the only item that showed a lower total than for 1921.

Total car loading during the week ended December 30, 1922, which included the Christmas holiday, was 711,200, a decrease of 123,000 cars as compared with the week before, but an increase of 182,644 cars as compared with the corresponding week of 1921 and of 108,832 cars as compared with 1920. The loading of grain and grain products was 16,000 and 17,000 cars, respectively, greater than for the corresponding weeks of the two preceding years, while coal loading was 68,000 cars greater than that for 1921 and even 911 cars greater than for 1920; large gains were shown in the loading of forest products, merchandise and miscellaneous freight. The summary for the week, and that for the preceding week are given in the accompanying tables.

The total loading by commodities for the past three years was as follows:

CARS OF REVENUE FREIGHT LOADED—CUMULATIVE JANUARY 1 TO DECEMBER 30 INCLUSIVE

| Commodities | 1922 | 1921 | 1920 |
|---|---|---|---|
| G. & G. P. | $2,467,358 | $2,292,779 | $1,843,018 |
| L. S. | 1,637,923 | 1,496,928 | 1,553,424 |
| Coal | 7,448,341 | 7,975,341 | 10,082,450 |
| Coke | 490,864 | 318,289 | 647,704 |
| F. P. | 2,939,046 | 2,486,581 | 3,057,730 |
| Ore | 1,586,396 | 906,842 | 2,410,229 |
| M.-L. C. L. | 11,877,812 | 11,010,090 | 9,012,511 |
| Misc. | 15,265,779 | 12,836,308 | 16,511,406 |
| Total | 43,713,519 | 39,323,158 | 45,118,472 |
| All commodities except coal | 36,265,178 | 31,347,817 | 35,036,022 |

The freight car shortage on December 23 fell below the hundred thousand mark for the first time since September 15. The total was 99,908 cars, a decrease since December 15 of 5,110 cars. The demand for box cars in excess of the supply totaled 43,697 on December 23, a reduction of 5,798 in

## REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS, THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED DECEMBER 23, 1922

| Districts | Year | Grain and grain products | Live stock | Coal | Coke | Forest products | Ore | Mdse. L.C.L. | Miscellaneous | Total revenue freight loaded: This year, 1922 | Corresponding year, 1921 | Corresponding year, 1920 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eastern | 1922 | 9,054 | 3,350 | 55,298 | 2,617 | 5,586 | 1,615 | 60,487 | 73,656 | 211,663 | ..... | ..... |
| | 1921 | 8,504 | 2,437 | 34,950 | 1,653 | 4,436 | 1,306 | 58,336 | 54,077 | ..... | 165,699 | 159,771 |
| Allegheny | 1922 | 3,327 | 2,750 | 48,916 | 6,642 | 3,653 | 1,502 | 44,073 | 66,383 | 177,245 | ..... | ..... |
| | 1921 | 2,601 | 2,267 | 38,555 | 3,645 | 2,575 | 2,037 | 43,097 | 42,060 | ..... | 136,837 | 145,147 |
| Pocahontas | 1922 | 207 | 78 | 16,961 | 567 | 1,541 | 186 | 5,725 | 3,160 | 28,425 | ..... | ..... |
| | 1921 | 185 | 50 | 16,556 | 138 | 1,206 | 21 | 5,096 | 2,718 | ..... | 25,970 | 24,746 |
| Southern | 1922 | 3,589 | 1,848 | 20,462 | 1,343 | 20,791 | 1,355 | 37,061 | 36,547 | 122,996 | ..... | ..... |
| | 1921 | 2,788 | 1,289 | 17,123 | 462 | 16,948 | 485 | 36,104 | 30,881 | ..... | 106,080 | 99,843 |
| Northwestern | 1922 | 16,569 | 9,999 | 11,889 | 1,526 | 12,287 | 1,169 | 24,501 | 28,354 | 106,294 | ..... | ..... |
| | 1921 | 9,468 | 6,915 | 7,171 | 944 | 9,333 | 336 | 23,735 | 20,994 | ..... | 78,896 | 72,497 |
| Central Western | 1922 | 13,509 | 10,794 | 21,884 | 425 | 6,889 | 2,523 | 30,252 | 39,691 | 125,967 | ..... | ..... |
| | 1921 | 9,837 | 8,462 | 18,055 | 240 | 4,205 | 741 | 29,426 | 27,198 | ..... | 98,164 | 96,334 |
| Southwestern | 1922 | 4,547 | 2,115 | 5,915 | 123 | 7,949 | 591 | 15,158 | 25,603 | 62,001 | ..... | ..... |
| | 1921 | 3,730 | 1,673 | 3,679 | 118 | 6,374 | 667 | 15,367 | 23,351 | ..... | 54,959 | 50,068 |
| Total Western Dists. | 1922 | 34,625 | 22,908 | 39,688 | 2,074 | 27,125 | 4,283 | 69,911 | 93,648 | 294,262 | ..... | ..... |
| | 1921 | 23,035 | 17,050 | 28,905 | 1,302 | 19,912 | 1,744 | 68,528 | 71,543 | ..... | 232,019 | 218,899 |
| Total all roads | 1922 | 50,802 | 30,934 | 181,325 | 13,243 | 58,696 | 8,941 | 217,256 | 273,394 | 834,591 | ..... | ..... |
| | 1921 | 37,113 | 23,093 | 136,089 | 7,200 | 45,077 | 5,593 | 211,161 | 201,279 | ..... | 666,605 | ..... |
| | 1920 | 29,254 | 20,618 | 178,187 | 10,246 | 38,510 | 8,594 | 166,739 | 196,258 | ..... | ..... | 648,406 |
| Increase compared | 1921 | 13,689 | 7,841 | 45,236 | 6,043 | 13,619 | 3,348 | 6,095 | 72,115 | 167,986 | ..... | ..... |
| Decrease compared | 1921 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Increase compared | 1920 | 21,548 | 10,316 | 3,138 | 2,997 | 20,186 | 347 | 50,517 | 77,136 | 186,185 | ..... | ..... |
| Decrease compared | 1920 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

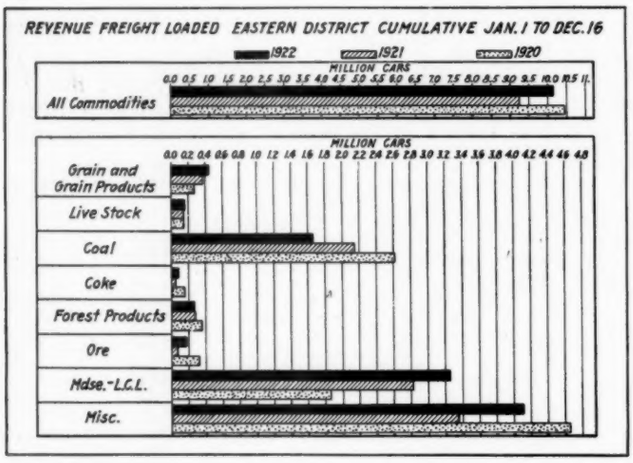
## REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS, THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, DECEMBER 30, 1922

| Districts | Year | Grain and grain products | Live stock | Coal | Coke | Forest products | Ore | Mdse. L.C.L. | Miscellaneous | Total revenue freight loaded: This year, 1922 | Corresponding year, 1921 | Corresponding year, 1920 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eastern | 1922 | 8,268 | 2,395 | 49,811 | 2,490 | 4,628 | 2,365 | 48,534 | 58,101 | 176,592 | ..... | ..... |
| | 1921 | 5,644 | 2,380 | 24,106 | 1,472 | 3,883 | 910 | 46,768 | 42,428 | ..... | 127,591 | 143,039 |
| Allegheny | 1922 | 2,779 | 2,493 | 48,692 | 5,854 | 2,835 | 1,383 | 36,571 | 53,056 | 153,663 | ..... | ..... |
| | 1921 | 2,083 | 2,321 | 29,871 | 3,080 | 1,970 | 1,897 | 35,382 | 33,512 | ..... | 110,116 | 136,508 |
| Pocahontas | 1922 | 143 | 76 | 16,778 | 526 | 849 | 129 | 4,514 | 2,169 | 25,184 | ..... | ..... |
| | 1921 | 133 | 69 | 8,973 | 125 | 742 | 23 | 3,808 | 1,895 | ..... | 15,768 | 24,829 |
| Southern | 1922 | 3,123 | 1,733 | 20,973 | 1,172 | 14,001 | 1,098 | 28,990 | 27,168 | 98,258 | ..... | ..... |
| | 1921 | 2,479 | 1,769 | 14,935 | 332 | 9,612 | 369 | 27,458 | 20,893 | ..... | 77,847 | 90,028 |
| Northwestern | 1922 | 15,504 | 8,492 | 9,647 | 1,538 | 10,405 | 924 | 20,285 | 26,419 | 93,214 | ..... | ..... |
| | 1921 | 7,845 | 7,568 | 6,847 | 999 | 7,158 | 271 | 18,688 | 18,963 | ..... | 68,339 | 66,536 |
| Central Western | 1922 | 11,942 | 9,180 | 21,714 | 417 | 5,096 | 1,936 | 26,114 | 33,709 | 110,108 | ..... | ..... |
| | 1921 | 8,548 | 8,439 | 16,762 | 234 | 3,271 | 615 | 24,716 | 21,648 | ..... | 84,233 | 93,325 |
| Southwestern | 1922 | 4,172 | 1,819 | 5,763 | 111 | 7,099 | 340 | 12,616 | 22,261 | 54,181 | ..... | ..... |
| | 1921 | 3,089 | 1,722 | 3,131 | 172 | 4,855 | 727 | 12,622 | 18,344 | ..... | 44,662 | 48,103 |
| Total Western Dists. | 1922 | 31,618 | 19,491 | 37,124 | 2,066 | 22,600 | 3,200 | 59,015 | 82,389 | 257,503 | ..... | ..... |
| | 1921 | 19,482 | 17,729 | 26,740 | 1,405 | 15,284 | 1,613 | 56,026 | 58,955 | ..... | 197,234 | 207,964 |
| Total all roads | 1922 | 45,931 | 26,188 | 173,378 | 12,108 | 44,913 | 8,175 | 177,624 | 222,883 | 711,200 | ..... | ..... |
| | 1921 | 29,821 | 24,268 | 104,625 | 6,414 | 31,491 | 4,812 | 169,442 | 157,683 | ..... | 528,556 | ..... |
| | 1920 | 28,773 | 23,875 | 172,467 | 10,286 | 31,189 | 8,280 | 150,480 | 177,018 | ..... | ..... | 602,368 |
| Increase compared | 1921 | 16,110 | 1,920 | 68,753 | 5,694 | 13,422 | 3,363 | 8,182 | 65,200 | 182,644 | ..... | ..... |
| Decrease compared | 1921 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Increase compared | 1920 | 17,158 | 2,313 | 911 | 1,822 | 13,724 | ..... | 27,144 | 45,865 | 108,832 | ..... | ..... |
| Decrease compared | 1920 | ..... | ..... | ..... | ..... | ..... | 105 | ..... | ..... | ..... | ..... | ..... |
| December 30 | 1922 | 45,931 | 26,188 | 173,378 | 12,108 | 44,913 | 8,175 | 177,624 | 222,883 | 711,200 | 528,556 | 602,368 |
| December 23 | 1922 | 50,802 | 30,934 | 181,325 | 13,243 | 58,696 | 8,941 | 217,256 | 273,394 | 834,591 | 666,605 | 648,406 |
| December 16 | 1922 | 51,004 | 39,148 | 198,510 | 13,226 | 60,102 | 10,748 | 224,460 | 290,884 | 888,082 | 726,074 | 802,271 |
| December 9 | 1922 | 55,608 | 38,170 | 200,505 | 13,051 | 63,195 | 9,879 | 228,392 | 311,028 | 919,828 | 741,341 | 837,953 |
| December 2 | 1922 | 49,341 | 34,381 | 186,158 | 13,075 | 60,010 | 10,550 | 199,717 | 291,987 | 845,219 | 741,849 | 882,604 |

Compiled by the Car Service Division of the American Railway Association.

approximately a week, while the demand for coal cars totaled 43,664, an increase of 2,464. With the lessening of the car shortage, there has been a steady increase in the number of




CARS OF REVENUE FREIGHT LOADED—EASTERN DISTRICT
CUMULATIVE JANUARY 1 TO DECEMBER 16

| Commodity | 1922 | 1921 | 1920 |
|---|---|---|---|
| Grain and Grain Products | 457,569 | 381,704 | 284,356 |
| Live Stock | 153,729 | 150,740 | 149,463 |
| Coal | 1,660,396 | 2,143,894 | 2,610,146 |
| Coke | 88,767 | 62,354 | 164,017 |
| Forest Products | 273,242 | 275,298 | 366,216 |
| Ore | 175,314 | 87,215 | 325,690 |
| Mdse.—L. C. L. | 3,252,808 | 2,811,225 | 1,877,778 |
| Miscellaneous | 4,120,015 | 3,350,687 | 4,667,306 |
| Total all commodities | 10,181,840 | 9,263,117 | 10,444,972 |

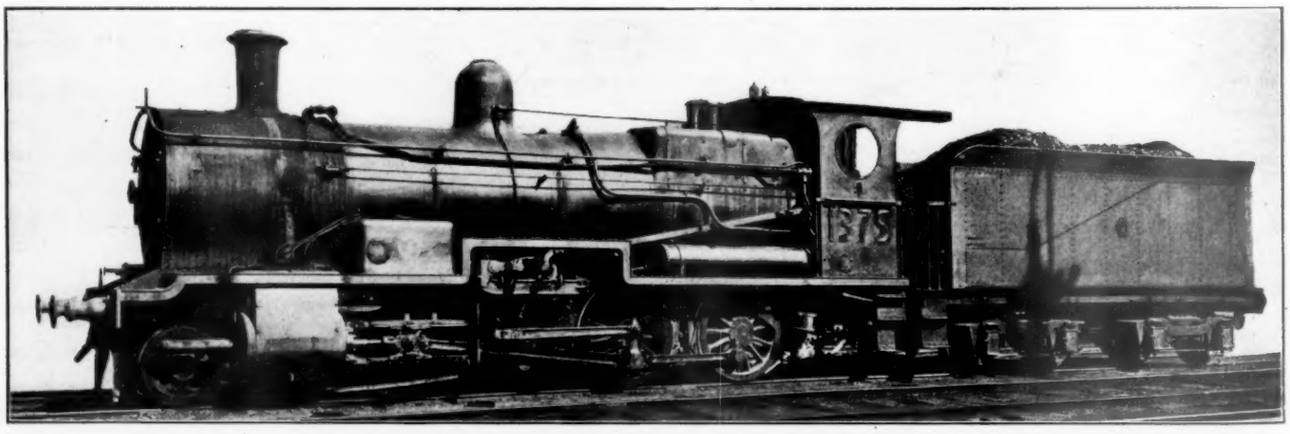
surplus freight cars of various classes and in good repair scattered throughout the country, the total for such cars on December 23 being 9,563.

# Electric Boiler for Heating Trains

A RECENT PAPER, presented by Sir Vincent Raven before the Institution of Mechanical Engineers in England, describes an electrically heated steam boiler designed by C. Orme Bastian, for the heating of trains on the electrified section of the North Eastern Railway, England. The problem to be solved arose in connection with the heating of rolling stock which passes from ordinary steam track over an electrified section. In the United States, this is usually done with an oil-fired boiler to provide the necessary steam. The equipment designed by Mr. Bastian has been entirely successful and it would not be surprising to find some similar method of train heating eventually substituted for the oil-fired boilers in this country.

The electric boiler installed on the new North Eastern locomotive is 3 ft. 4 in. in diameter and 3 ft. 4 in. long; it is capable of supplying enough steam for the largest train handled in ordinary service. The total loading is 408 kw., but usually this is not required. Heat regulation is secured by grouping the elements in four sets, which permits of six stages from 68 to 408 kw. Tests made at three-quarters load, with an input of 298 kw.-hrs. showed an evaporation of 970 lb. of water at 120 lb. pressure; this pressure was reached in 24 min. after first switching on with feedwater at 41 deg. Fahr. Current is taken at the full line pressure of 1,500 volts, and an efficiency of 98 per cent is shown.

The construction of the boiler is extremely simple, being of the ordinary multi-tubular type, without any of the usual accessories. There are 144 tubes, into each of which is introduced a quartz tube, ¾ in. in diameter; inside of each tube is a close spiral heating element of resistance wire. Wound in this way the wire is free from the risk of developing hot spots; something which must be carefully guarded against under the special conditions. So satisfactory is the design claimed to be that the firm of Bastian & Allen is willing to build electric boilers even on direct current lines up to 3,000 volts. Simple but adequate means are taken to insure satisfactory connection with the elements and to prevent damage to the quartz tube by vibration. The tube is mounted on a mica washer in the end of a hollow porcelain terminal, which is held by spring pressure to the terminal plate of the boiler. The end of the element is silver soldered to the terminal, which is brought in through the porcelain. As extended trials have been made under service conditions with a 50 hp. boiler, the design may be regarded as having been thoroughly tried out. The rating of the boiler is approximately 547 hp. Its compactness, convenience, perfection of control, efficiency, and other qualities should recommend it for adoption in other directions. There are cases where steam has to be applied at places remote from any point where a fuel-fired boiler can be conveniently or safely placed. Under conditions in which the electrically fired boiler can be placed where it is needed, thereby eliminating all pipe losses, it may prove the most economical as well as the handiest solution. The electric boiler has proved satisfactory under conditions of vibration and shock.



**An Australian Freight Locomotive**

Standard Gage; Cylinders 22 in. by 26 in.; Diameter of Driving Wheels, 51 in.; Inside Diameter of Boiler, 60¼ in.; Steam Pressure, 160 lb.; Tractive Effort, 33,600 lb.; Tender Capacity, 14½ Tons of Coal and 4,800 Gal. of Water.

# General News Department

**Arguments were heard** by the United States Supreme Court this week in the New England rate division case and also in the Pennsylvania-Labor Board case.

**The Interstate Commerce Commission** has issued modifications of its automatic train control order authorizing the Missouri Pacific to make its installation on a locomotive division between St. Louis, Mo., and Council Grove, Kans., instead of between St. Louis and Kansas City, and authorizing the New York, New Haven & Hartford to make its installation between Air Line Junction, New Haven, Conn., and Springfield, Mass.

## Interchange and Loading Rules

The Mechanical Division of the American Railway Association has recently announced that because a considerable number of refrigerator cars have not yet been equipped with brine retaining devices as required by Interchange Rule 3, Section s, the effective date of this provision of the rule has been extended to January 1, 1924.

The Interchange and Loading Rules as revised in 1922 have now been issued and may be obtained from the secretary of the division.

## I. C. C. to Investigate Railway Efficiency

The Interstate Commerce Commission on Thursday announced a proceeding of investigation into the efficiency and economy of railroad management, as to whether expenditures by the carriers for maintenance of equipment have been reasonable, the manner and method in which the business of the carriers is conducted, with special reference to the furnishing of car service, and whether the courses adopted by the carriers in the maintenance of equipment and in providing car service have been efficient and economical and whether the service provided has been reasonably adequate.

## January Meeting of New York Railroad Club

The New York Railroad Club will hold its January meeting on Friday evening, January 19, at the Engineering Societies building, New York. Walter B. Russell, director of Franklin Union, Boston, will speak on apprenticeship and employee training. Mr. Russell is one of the leading technical educators of this country. He worked for several years in developing one of the railroad shop apprenticeship systems. A. F. Stuebing, of the *Railway Age* and Railway Mechanical Engineer, will give a brief talk opening a discussion on "Are We Due for a Radical Change in Locomotive Construction?" John Draney, of the Dalaware, Lackawanna & Western, will tell of the aims and possibilities of the veterans' associations and the extent to which they have been organized on the different railroads. An open forum for general discussion will follow these addresses.

## Program for American Society of Civil Engineers' Meeting

The American Society of Civil Engineers will hold its seventieth annual meeting at its headquarters in the Engineering Societies building, West 39th street, New York City, on January 17, 18 and 19. The convention will be called to order at 10 o'clock on Wednesday morning, the 17th. Following the transaction of routine business, honorary membership will be conferred upon six eminent engineers, including John F. Stevens, consulting railway engineer of New York City. In the afternoon a joint session on engineering education will be held with the Society for the Promotion of Engineering Education. Thursday will be spent in an excursion to Bethlehem, Pa., to inspect Lehigh University and the steel works of the Bethlehem Steel Company. On Thursday evening Julius H. Barnes, president of the Chamber of Commerce of the United States, will speak on Transportation Keyed to Production. Friday morning will be devoted to the consideration of engineering research and Friday afternoon to city planning.

## Height of Standard Box Cars

The Committee on Car Construction of the Mechanical Division of the American Railway Association has practically completed designs for standard box cars of 40 and 50 tons' capacity for submission at the next meeting. In the latter part of 1920 inside dimensions for box cars were adopted as follows: length, 40 ft. 6 in.; width, 8 ft. 6 in.; height (minimum), 8 ft. 6 in. With the length and width specified the maximum inside height that can be obtained within road clearances is 9 ft. 3 in. As the committee desires to show designs of cars that will meet the requirements and views of the majority of the railroads as to inside height and which can be used with a minimum of change, the American Railway Association has issued a circular requesting the member roads to vote for the height which they prefer. The circular explains that each additional inch of height above 8 ft. 6 in. will add approximately 70 lb. to the light weight of the car and will also add to the cost.

## Locomotive Output for December and for 1922

The shipments of locomotives in December, as compiled by the Department of Commerce from reports to the Bureau of the Census from the principal manufacturers, were the largest since January, 1921, and amounted to 210 locomotives. Unfilled orders on December 31 amounted to 1,592 locomotives, a slight decline from the previous month. Total shipments of locomotives for the year 1922 were smaller than for 1921 on account of the decline in foreign shipments. The following table compares the December figures and the complete yearly totals for 1921 and 1922, in number of locomotives.

| | December 1922 | December 1921 | Year 1922 | Year 1921 |
|---|---|---|---|---|
| Shipments: | | | | |
| Domestic | 194 | 30 | 1.056 | 830 |
| Foreign | 16 | 59 | 218 | 519 |
| Total | 210 | 89 | 1,274 | 1,349 |
| Unfilled Orders: | | | | |
| Domestic | 1,498 | 143 | ..... | ..... |
| Foreign | 94 | 122 | ..... | ..... |
| Total | 1,592 | 265 | ..... | ..... |

## I. C. C. Denies It Has Made Definite Demand for Excess Earnings

The Interstate Commerce Commission through its general counsel, P. F. Farrell, has filed an answer to the complaint of the Dayton-Goose Creek Railway in the United States district court at Beaumont, Texas, in which the railroad asked for an injunction to restrain the Interstate Commerce Commission from attempting to collect one-half of its excess earnings for 1920 and 1921. The commission denies that its orders referred to, requiring railroads to make reports of their excess income, were made with the design of enforcing the recapture provisions of the law, but it admits that they were made "as a procedural step deemed necessary and appropriate for the purpose of enforcing, in so far as with it lies" the provisions of the section. The commission denies that its order directed the complainant to pay to the commission one-half of the excess income or that it made any definite or fixed demand for such payment, but stated that the orders "are simply admonitory and intended to remind complainant of the requirements of Section 15-a." It also denies that it made any effort to compel the payment and it disclaims information sufficient to form a belief as to whether the allegations relating to net earnings and property values are true.

# REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1922

| Name of road. | | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of Way and structures. | Maintenance of Equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| Akron, Canton & Youngstown | Nov. | 170 | $176,936 | $790 | $188,800 | $29,747 | $23,824 | $5,281 | $60,934 | $7,748 | $127,534 | 67.50 | $61,266 | $50,153 | $25,915 | $7,071 |
| | 11 mos. | 170 | 1,903,804 | 13,845 | 2,010,653 | 248,803 | 217,093 | 64,935 | 580,584 | 92,568 | 1,203,570 | 59.90 | 807,083 | 695,342 | 405,296 | 217,085 |
| Alabama & Vicksburg | Nov. | 141 | 217,660 | 56,620 | 289,604 | 53,796 | 79,238 | 6,293 | 98,727 | 11,723 | 251,795 | 87.00 | 37,805 | 18,381 | 24,664 | 39,264 |
| | 11 mos. | 141 | 1,936,042 | 628,057 | 2,760,129 | 514,353 | 548,525 | 89,791 | 1,056,112 | 129,819 | 2,359,791 | 85.50 | 400,338 | 189,056 | 242,650 | 227,934 |
| Vicksburg, Shreveport & Pacific | Nov. | 171 | 228,313 | 72,376 | 345,663 | 54,322 | 64,074 | 10,448 | 115,853 | 13,469 | 260,774 | 75.40 | 84,889 | 66,603 | 46,664 | 60,413 |
| | 11 mos. | 171 | 2,098,020 | 996,913 | 3,344,315 | 575,067 | 603,045 | 108,551 | 1,299,976 | 148,283 | 2,760,550 | 82.50 | 583,765 | 377,018 | 283,237 | 387,318 |
| Ann Arbor | Nov. | 293 | 409,313 | 35,334 | 465,380 | 44,887 | 75,137 | 8,474 | 203,133 | 18,402 | 350,087 | 75.20 | 115,293 | 92,824 | 56,950 | 70,967 |
| | 11 mos. | 293 | 3,939,436 | 463,872 | 4,620,178 | 564,536 | 840,598 | 101,909 | 2,027,150 | 176,767 | 3,711,145 | 80.30 | 903,033 | 670,422 | 386,575 | 432,172 |
| Atchison, Topeka & Santa Fe | Nov. | 8,855 | 13,543,540 | 3,512,389 | 18,757,744 | 1,907,656 | 3,724,130 | 299,642 | 5,597,004 | 297,181 | 11,818,514 | 63.00 | 6,939,230 | 4,639,268 | 4,561,313 | 6,026,110 |
| | 11 mos. | 8,856 | 119,545,938 | 38,491,759 | 172,414,489 | 27,598,956 | 39,488,137 | 2,930,485 | 53,891,247 | 3,605,771 | 127,299,667 | 73.80 | 45,114,822 | 30,004,671 | 31,364,394 | 44,435,452 |
| Gulf, Colorado & Santa Fe | Nov. | 1,907 | 2,052,494 | 347,261 | 2,542,300 | 267,048 | 452,789 | 46,681 | 755,523 | 62,177 | 1,583,499 | 62.30 | 958,801 | 860,003 | 768,152 | 321,665 |
| | 11 mos. | 7,907 | 16,545,081 | 3,746,732 | 21,701,157 | 3,846,938 | 4,937,684 | 475,941 | 6,961,439 | 737,287 | 16,943,253 | 78.10 | 4,757,904 | 3,926,074 | 3,232,755 | 6,340,243 |
| Panhandle & Santa Fe | Nov. | 857 | 691,276 | 129,998 | 861,576 | 174,522 | 210,525 | 7,890 | 266,052 | 17,571 | 674,864 | 78.30 | 186,706 | 127,801 | 78,515 | 172,698 |
| | 11 mos. | 857 | 5,565,906 | 1,291,307 | 7,317,386 | 1,827,001 | 2,127,230 | 78,727 | 2,369,037 | 205,462 | 6,596,496 | 90.10 | 720,890 | 435,198 | 76,700 | 1,975,997 |
| Atlanta & West Point | Nov. | 93 | 165,032 | 76,832 | 268,499 | 31,333 | 43,970 | 8,538 | 87,288 | 10,139 | 184,490 | 68.70 | 84,009 | 65,261 | 49,183 | 3,115 |
| | 11 mos. | 93 | 1,965,704 | 791,976 | 2,364,352 | 310,339 | 482,623 | 87,333 | 882,346 | 113,127 | 1,915,860 | 81.00 | 448,492 | 311,890 | 217,178 | 121,883 |
| Western of Alabama | Nov. | 133 | 196,387 | 73,193 | 291,481 | 39,750 | 48,083 | 8,616 | 82,165 | 10,781 | 192,222 | 65.90 | 99,259 | 79,865 | 69,820 | 3,670 |
| | 11 mos. | 133 | 1,495,086 | 732,699 | 2,487,852 | 304,913 | 505,983 | 93,659 | 793,723 | 116,965 | 1,849,039 | 74.30 | 638,813 | 492,843 | 486,843 | 225,843 |
| Atlanta, Birmingham & Atlantic | Nov. | 639 | 310,579 | 49,602 | 383,516 | 66,302 | 89,759 | 21,242 | 190,554 | 15,202 | 383,115 | 99.80 | 401 | —13,293 | —11,566 | —95,133 |
| | 11 mos. | 639 | 2,894,392 | 446,651 | 3,625,378 | 663,015 | 957,449 | 233,461 | 1,810,114 | 172,518 | 3,837,433 | 105.80 | —212,055 | —366,946 | —450,974 | —1,599,249 |
| Atlantic Coast Line | Nov. | 4,930 | 4,369,885 | 1,270,474 | 6,162,691 | 786,441 | 1,377,686 | 119,058 | 2,273,710 | 129,824 | 4,716,584 | 76.50 | 1,446,107 | 939,413 | 1,085,595 | 590,860 |
| | 11 mos. | 4,924 | 44,025,250 | 14,207,068 | 63,746,153 | 7,567,964 | 12,950,535 | 1,162,035 | 23,523,420 | 1,500,760 | 47,022,002 | 73.80 | 16,724,151 | 13,174,442 | 13,184,078 | 4,307,390 |
| Charleston & Western Carolina | Nov. | 342 | 214,163 | 37,444 | 265,776 | 27,265 | 47,152 | 6,046 | 111,974 | 6,078 | 198,515 | 74.70 | 67,261 | 56,220 | 45,677 | —9,348 |
| | 11 mos. | 342 | 2,368,383 | 419,280 | 2,953,837 | 459,385 | 447,824 | 73,341 | 1,214,728 | 73,340 | 2,268,618 | 76.80 | 685,219 | 563,256 | 473,641 | —231,446 |
| Baltimore & Ohio | Nov. | 5,235 | 16,412,135 | 2,025,763 | 19,845,040 | 2,000,188 | 4,803,015 | 296,770 | 8,136,835 | 460,195 | 15,822,260 | 79.70 | 4,022,780 | 3,702,483 | 3,024,073 | 1,506,601 |
| | 11 mos. | 5,235 | 142,487,343 | 24,339,770 | 179,894,064 | 21,306,595 | 44,176,411 | 3,263,598 | 74,335,637 | 5,192,234 | 149,780,776 | 83.30 | 30,113,288 | 23,347,548 | 18,596,450 | 20,200,295 |
| Balti. & Ohio Chicago Term | Nov. | 91 | ..... | ..... | 301,310 | 25,548 | 47,287 | 1,701 | 166,760 | 10,896 | 256,605 | 85.20 | 44,707 | —6,690 | 84,845 | 39,549 |
| | 11 mos. | 91 | ..... | ..... | 2,846,888 | 381,654 | 407,363 | 20,476 | 1,620,204 | 113,108 | 2,593,631 | 91.10 | 253,255 | —286,338 | 921,371 | 562,643 |
| Staten Island Rapid Transit | Nov. | 23 | 77,621 | 83,657 | 184,475 | 34,064 | 31,779 | 2,115 | 111,247 | 13,114 | 192,319 | 104.30 | —7,844 | —31,035 | —49,101 | —41,838 |
| | 11 mos. | 23 | 827,564 | 1,125,015 | 2,228,610 | 555,189 | 369,348 | 22,050 | 1,304,909 | 149,070 | 2,400,566 | 107.70 | —171,956 | —371,953 | —525,775 | —314,930 |
| Bangor & Aroostook | Nov. | 616 | 515,553 | 77,986 | 619,064 | 120,442 | 121,162 | 5,117 | 197,936 | 18,055 | 455,572 | 73.60 | 163,492 | 115,132 | 157,744 | 138,122 |
| | 11 mos. | 624 | 5,852,552 | 817,502 | 6,929,294 | 1,368,257 | 1,372,693 | 44,890 | 1,991,122 | 211,489 | 5,004,878 | 72.20 | 1,924,416 | 1,416,061 | 1,640,886 | 1,016,513 |
| Belt Ry. of Chicago | Nov. | 32 | ..... | ..... | 612,709 | 39,981 | 58,333 | 2,225 | 256,530 | 25,956 | 383,025 | 62.50 | 229,684 | 195,887 | 148,698 | 134,699 |
| | 11 mos. | 32 | ..... | ..... | 5,590,547 | 521,098 | 541,349 | 24,054 | 2,469,640 | 123,774 | 3,679,915 | 65.80 | 1,910,631 | 1,526,624 | 1,535,983 | 1,470,196 |
| Bessemer & Lake Erie | Nov. | 225 | 1,607,679 | 28,007 | 1,662,570 | 150,299 | 336,036 | 15,620 | 429,768 | 27,970 | 966,881 | 58.20 | 695,689 | 588,936 | 785,058 | 118,015 |
| | 11 mos. | 225 | 12,793,025 | 348,648 | 13,395,146 | 1,239,239 | 3,507,989 | 164,336 | 3,975,203 | 285,472 | 9,235,923 | 68.90 | 4,159,223 | 3,734,967 | 4,411,962 | 1,996,711 |
| Bingham & Garfield | Nov. | 34 | 26,556 | 9 | 27,368 | 23,728 | 8,632 | 1,313 | 6,399 | 4,125 | 44,389 | 162.20 | —17,021 | —21,662 | —481 | —19,808 |
| | 11 mos. | 34 | 204,773 | 886 | 208,696 | 176,485 | 48,610 | 14,990 | 56,514 | 46,327 | 343,776 | 164.70 | —135,089 | —184,435 | —53,350 | —264,869 |
| Boston & Maine | Nov. | 2,287 | 4,550,757 | 1,677,851 | 7,057,448 | 718,269 | 1,432,701 | 50,046 | 3,463,378 | 192,975 | 5,883,739 | 83.40 | 1,173,709 | 912,529 | 494,328 | 467,942 |
| | 11 mos. | 2,287 | 44,270,484 | 20,625,217 | 73,006,493 | 10,348,596 | 14,456,170 | 605,575 | 33,130,520 | 2,319,232 | 61,164,707 | 83.40 | 11,841,786 | 9,461,256 | 6,243,438 | —909,411 |
| Brooklyn Eastern District Term | Nov. | 9 | 131,978 | ..... | 140,674 | 5,495 | 11,747 | 714 | 50,304 | 4,223 | 72,483 | 51.50 | 68,191 | 61,979 | 61,979 | 31,536 |
| | 11 mos. | 9 | 1,362,274 | ..... | 1,450,450 | 61,870 | 186,408 | 2,268 | 548,065 | 51,486 | 850,097 | 58.60 | 600,353 | 529,967 | 529,967 | 298,461 |
| Buffalo & Susquehanna | Nov. | 253 | 213,619 | 4,396 | 222,082 | 37,794 | 73,339 | 1,623 | 72,577 | 8,513 | 193,846 | 87.30 | 28,236 | 15,979 | 68,408 | 27,217 |
| | 11 mos. | 253 | 1,333,053 | 58,580 | 1,435,202 | 363,032 | 472,305 | 23,334 | 523,906 | 97,698 | 1,480,275 | 103.10 | —45,073 | —99,656 | 166,044 | 47,997 |
| Buffalo, Rochester & Pittsburg | Nov. | 589 | 2,074,939 | 130,128 | 2,256,391 | 269,562 | 784,767 | 20,715 | 812,025 | 42,200 | 1,929,382 | 85.50 | 327,009 | 311,946 | 333,932 | 68,848 |
| | 11 mos. | 589 | 12,512,172 | 1,485,996 | 14,658,194 | 2,211,195 | 5,686,221 | 211,611 | 5,946,529 | 433,236 | 14,502,327 | 98.90 | 155,867 | —194,254 | 244,834 | 518,551 |
| Canadian Pacific (Lines in Maine) | Nov. | 233 | 162,975 | 27,256 | 206,950 | 24,139 | 41,928 | 4,745 | 113,801 | 3,700 | 188,313 | 91.00 | 18,637 | 8,637 | 4,488 | —45,336 |
| | 11 mos. | 233 | 1,798,991 | 357,766 | 2,329,524 | 375,558 | 466,273 | 48,463 | 1,154,837 | 41,175 | 2,086,306 | 89.60 | 243,218 | 73,218 | —26,277 | —180,612 |
| Carolina, Clinchfield & Ohio | Nov. | 309 | 615,168 | 38,267 | 665,930 | 82,894 | 118,521 | 22,741 | 195,671 | 18,542 | 438,324 | 65.80 | 227,606 | 167,606 | 219,707 | 289,972 |
| | 11 mos. | 298 | 6,385,450 | 434,210 | 6,959,605 | 826,492 | 1,453,313 | 241,184 | 1,810,520 | 211,374 | 4,539,613 | 65.20 | 2,419,992 | 1,914,213 | 2,692,145 | 2,267,109 |
| Central of Georgia | Nov. | 1,920 | 1,561,739 | 412,320 | 2,165,549 | 280,481 | 384,863 | 63,526 | 795,335 | 75,215 | 1,605,064 | 74.10 | 560,485 | 430,518 | 482,799 | 177,992 |
| | 11 mos. | 1,918 | 14,409,569 | 4,607,589 | 21,078,853 | 2,743,340 | 3,959,046 | 714,133 | 7,964,362 | 815,372 | 16,263,236 | 77.20 | 4,815,617 | 3,696,271 | 3,959,010 | 1,214,309 |
| Central of New Jersey | Nov. | 691 | 3,742,605 | 681,413 | 4,797,187 | 500,561 | 1,441,339 | 37,371 | 2,104,070 | 98,302 | 4,201,071 | 87.60 | 596,116 | 216,811 | 200,627 | —281,315 |
| | 11 mos. | 691 | 33,016,685 | 8,776,762 | 44,902,859 | 5,080,753 | 11,557,642 | 377,410 | 19,576,082 | 1,137,978 | 37,925,594 | 84.50 | 6,977,265 | 3,898,441 | 3,614,791 | 6,075,251 |
| Central Vermont | Nov. | 532 | 705,000 | 91,492 | 860,933 | 79,774 | 113,029 | 10,056 | 440,604 | 18,704 | 663,645 | 77.10 | 197,288 | 179,027 | 124,186 | 110,689 |
| | 11 mos. | 532 | 5,082,849 | 1,114,252 | 6,867,845 | 978,607 | 1,053,278 | 140,140 | 3,484,310 | 246,681 | 5,918,395 | 86.20 | 949,450 | 754,544 | 373,404 | —717,537 |
| Chesapeake & Ohio | Nov. | 2,550 | 5,627,181 | 815,648 | 6,801,070 | 797,700 | 2,075,087 | 81,789 | 2,648,076 | 169,119 | 5,797,391 | 85.20 | 1,003,679 | 735,365 | 728,577 | 1,134,164 |
| | 11 mos. | 2,548 | 62,523,841 | 9,627,568 | 75,999,770 | 9,422,405 | 20,490,329 | 862,287 | 27,581,471 | 1,769,892 | 60,398,810 | 79.50 | 15,600,960 | 12,648,211 | 13,022,512 | 12,197,547 |
| Chicago & Alton | Nov. | 1,050 | 1,888,098 | 457,277 | 2,575,120 | 304,293 | 882,154 | 56,602 | 972,367 | 61,209 | 2,289,484 | 88.90 | 285,636 | 209,521 | 99,210 | 81,563 |
| | 11 mos. | 1,050 | 17,040,492 | 5,468,695 | 24,711,937 | 3,422,173 | 7,110,781 | 604,535 | 10,175,778 | 629,809 | 22,072,187 | 89.30 | 2,639,750 | 1,808,280 | 552,598 | 1,779,822 |
| Chicago & Eastern Illinois | Nov. | 945 | 1,743,161 | 358,624 | 2,271,849 | 223,029 | 696,700 | 40,891 | 938,479 | 64,231 | 1,973,698 | 86.90 | 298,151 | 187,965 | 318,678 | 284,056 |
| | 11 mos. | 945 | 16,374,990 | 4,139,142 | 22,208,348 | 2,571,552 | 5,936,849 | 467,793 | 9,349,646 | 719,431 | 19,162,905 | 86.30 | 3,045,443 | 2,001,102 | 2,227,028 | 2,044,974 |
| Chicago & North Western | Nov. | 8,403 | 9,386,073 | 2,185,906 | 12,853,797 | 1,735,594 | 3,100,583 | 144,137 | 5,341,150 | 311,802 | 10,697,234 | 83.20 | 2,156,563 | 1,402,502 | 1,327,182 | —10,608 |
| | 11 mos. | 8,403 | 92,643,936 | 26,635,085 | 134,109,512 | 17,906,536 | 27,607,323 | 1,667,170 | 57,654,474 | 3,419,544 | 108,973,929 | 81.30 | 25,135,583 | 16,856,651 | 15,871,144 | 7,160,924 |
| Chicago, Burlington & Quincy | Nov. | 9,393 | 12,137,357 | 2,288,592 | 15,616,190 | 1,395,852 | 3,690,773 | 176,698 | 5,908,033 | 394,091 | 11,592,619 | 74.20 | 4,023,571 | 3,190,522 | 2,925,137 | 1,960,011 |
| | 11 mos | 9,393 | 110,496,979 | 25,964,698 | 149,855,219 | 19,357,428 | 32,027,856 | 2,066,281 | 57,744,717 | 3,894,074 | 115,854,897 | 77.30 | 34,000,322 | 23,934,710 | 22,084,768 | 26,695,721 |
| Chicago Great Western | Nov. | 1,496 | 1,634,554 | 346,466 | 2,150,586 | 273,689 | 590,576 | 61,773 | 913,227 | 55,063 | 1,908,010 | 88.70 | 242,576 | 167,958 | —27,327 | —66,208 |
| | 11 mos. | 1,496 | 16,196,843 | 3,945,655 | 22,076,038 | 3,479,535 | 5,296,335 | 702,873 | 9,387,844 | 608,269 | 19,624,092 | 88.90 | 2,451,946 | 1,568,847 | —19,299 | 1,149,275 |

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1922—CONTINUED

| Name of road. | | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of—Way and structures. | Maintenance of—Equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| Chicago, Indianapolis & Louisville | Nov. | 654 | $1,028,612 | $243,063 | $1,414,719 | $129,289 | $315,466 | $30,645 | $522,468 | $35,475 | $1,045,511 | 73.90 | $369,308 | $302,483 | $189,017 | $213,049 |
| | 11 mos. | 654 | 10,334,889 | 2,773,847 | 14,526,700 | 1,503,778 | 3,172,730 | 353,639 | 5,474,889 | 383,833 | 11,035,001 | 76.00 | 3,491,699 | 2,787,887 | 1,628,307 | 1,023,005 |
| Chicago, Milwaukee & St. Paul | Nov. | 11,030 | 11,231,867 | 1,890,837 | 14,549,839 | 1,554,866 | 3,261,519 | 189,025 | 6,162,081 | 305,703 | 11,537,144 | 79.30 | 3,012,695 | 2,227,027 | 1,918,607 | 6,145 |
| | 11 mos. | 11,030 | 105,704,679 | 22,059,024 | 142,983,970 | 18,573,204 | 33,042,808 | 2,053,724 | 59 999,285 | 3,449,867 | 117,816,109 | 82.40 | 25,167,861 | 16,302,206 | 12,123,992 | 5,087,039 |
| Chicago, Peoria & St. Louis | Nov. | 246 | 158,073 | 14,945 | 180,937 | 25,239 | 37,100 | 3,787 | 98,855 | 10,283 | 175,264 | 96.90 | 5,673 | —5,227 | —27,812 | —60,600 |
| | 11 mos. | 246 | 1,610,754 | 194,860 | 1,928,579 | 306,461 | 393,249 | 47,547 | 1,123,586 | 114,917 | 1,985,760 | 103.00 | —57,181 | —166,080 | —422,743 | —521,241 |
| Chicago River & Indiana | Nov. | 38 | ..... | ..... | 619,741 | 61,426 | 78,327 | 971 | 234,200 | 7,607 | 382,531 | 61.70 | 237,210 | 194,019 | 290,859 | ..... |
| | 11 mos. | 38 | ..... | ..... | 3,710,667 | 372,351 | 418,708 | 5,201 | 1,448,293 | 60,329 | 2,304,882 | 62.10 | 1,405,785 | 1,129,067 | 1,673,583 | ..... |
| Chicago, Rock Island & Pacific | Nov. | 7,635 | 7,394,218 | 2,130,327 | 10,356,585 | 1,296,583 | 2,062,539 | 182,974 | 4,251,397 | 242,540 | 8,089,508 | 78.10 | 2,267,077 | 1,741,652 | 1,418,821 | 793,094 |
| | 11 mos. | 7,656 | 76,440,098 | 24,396,445 | 109,198,522 | 13,647,855 | 22,835,744 | 1,953,340 | 45,899,460 | 2,562,682 | 87,443,298 | 80.10 | 21,755,224 | 15,864,454 | 12,606,115 | 13,847,757 |
| Chicago, Rock Island & Gulf | Nov. | 461 | 398,255 | 78,896 | 516,936 | 75,732 | 65,552 | 12,768 | 263,460 | 13,937 | 432,655 | 83.70 | 84,281 | 69,482 | 59,722 | 83,079 |
| | 11 mos. | 461 | 4,042,024 | 854,319 | 5,330,541 | 799,219 | 805,474 | 146,216 | 2,439,675 | 151,848 | 4,349,691 | 81.60 | 980,850 | 844,819 | 657,974 | 1,280,004 |
| Chicago, St. Paul, Minn. & Omaha | Nov. | 1,749 | 1,636,638 | 460,048 | 2,278,352 | 344,606 | 479,879 | 34,465 | 1,053,997 | 67,656 | 1,988,035 | 87.30 | 290,317 | 160,297 | 220,445 | 126,342 |
| | 11 mos. | 1,749 | 17,976,853 | 5,540,520 | 25,425,179 | 3,356,472 | 4,597,878 | 369,261 | 11,409,111 | 780,990 | 20,614,084 | 81.10 | 4,811,095 | 3,329,318 | 3,106,654 | 1,511,239 |
| Cincinnati, Indianapolis & Western | Nov. | 347 | 353,737 | 39,369 | 418,633 | 45,729 | 112,824 | 10,537 | 178,771 | 23,387 | 372,642 | 89.00 | 45,991 | 27,656 | —6,423 | —28,522 |
| | 11 mos. | 347 | 3,226,028 | 497,787 | 3,957,191 | 499,249 | 868,739 | 120,477 | 1,701,552 | 218,415 | 3,430,013 | 86.70 | 527,178 | 347,166 | 58,933 | —727,711 |
| Colorado & Southern | Nov. | 1,099 | 849,616 | 147,483 | 1,131,997 | 178,426 | 336,900 | 11,214 | 496,222 | 42,142 | 1,087,601 | 96.10 | 44,396 | —15,009 | —52,107 | 286,886 |
| | 11 mos. | 1,099 | 9,146,890 | 1,869,004 | 11,951,036 | 1,808,938 | 2,704,433 | 145,129 | 4,552,916 | 477,826 | 9,794,446 | 82.00 | 2,156,590 | 1,423,868 | 1,039,775 | 1,869,401 |
| Ft. Worth & Denver City | Nov. | 456 | 720,395 | 184,001 | 955,070 | 102,331 | 277,058 | 10,473 | 299,396 | 32,890 | 782,852 | 76.30 | 226,218 | 175,108 | 164,794 | 376,521 |
| | 11 mos. | 456 | 6,179,529 | 2,075,840 | 8,803,826 | 784,754 | 1,876,662 | 125,271 | 2,829,406 | 384,304 | 6,060,641 | 68.80 | 2,743,185 | 2,256,272 | 2,137,284 | 3,287,755 |
| Wichita Valley | Nov. | 256 | 138,233 | 23,988 | 169,868 | 23,785 | 18,324 | 5 | 60,582 | 1,395 | 104,080 | 61.30 | 65,788 | 54,000 | 32,870 | 85,035 |
| | 11 mos. | 256 | 888,588 | 252,906 | 1,225,588 | 223,809 | 108,876 | 438 | 499,856 | 15,834 | 845,224 | 69.00 | 380,363 | 305,374 | 154,016 | 391,796 |
| Columbus & Greenville | Nov. | 167 | 103,969 | 39,357 | 149,625 | 32,230 | 18,706 | 3,228 | 49,195 | 8,040 | 111,399 | 74.50 | 38,226 | 34,179 | 21,100 | 27,966 |
| | 11 mos. | 193 | 1,025,132 | 324,226 | 1,420,009 | 321,999 | 137,006 | 34,947 | 510,252 | 93,979 | 1,098,130 | 77.30 | 321,879 | 269,213 | 151,054 | —380,485 |
| Delaware & Hudson | Nov. | 887 | 3,435,867 | 237,216 | 3,856,931 | 358,697 | 1,190,901 | 44,346 | 1,599,889 | 151,210 | 3,366,468 | 87.30 | 490,463 | 402,469 | 396,404 | 515,758 |
| | 11 mos. | 887 | 27,842,454 | 3,489,903 | 34,289,235 | 4,804,039 | 10,373,675 | 483,214 | 14,335,421 | 1,626,214 | 32,097,723 | 93.60 | 2,191,512 | 1,238,256 | 1,141,777 | 6,923,032 |
| Delaware, Lackawanna & Western | Nov. | 994 | 5,001,662 | 1,094,108 | 6,866,909 | 526,131 | 2,147,468 | 112,052 | 3,127,135 | 150,339 | 6,117,057 | 89.10 | 749,852 | 335,447 | 481,629 | 1,731,288 |
| | 11 mos. | 994 | 46,897,702 | 12,837,926 | 68,112,454 | 7,393,929 | 16,789,659 | 1,256,601 | 30,227,393 | 1,722,053 | 57,974,400 | 85.10 | 10,138,054 | 5,593,298 | 6,339,892 | 13,070,433 |
| Denver & Rio Grande Western | Nov. | 2,593 | 2,400,913 | 410,247 | 3,101,986 | 463,471 | 988,571 | 43,465 | 1,219,091 | 84,012 | 2,839,699 | 91.50 | 262,287 | 142,106 | 156,778 | 152,208 |
| | 11 mos. | 2,593 | 22,658,637 | 5,169,163 | 30,320,175 | 4,674,968 | 6,626,431 | 495,016 | 10,376,707 | 913,005 | 23,623,746 | 77.90 | 6,696,429 | 4,967,633 | 5,277,790 | 3,224,779 |
| Denver & Salt Lake | Nov. | 255 | 202,840 | 16,578 | 228,532 | 38,319 | 67,647 | 902 | 73,327 | 5,800 | 185,995 | 81.40 | 42,537 | 33,544 | 37,663 | 45,970 |
| | 11 mos. | 255 | 1,116,289 | 193,708 | 1,407,510 | 481,032 | 312,972 | 10,687 | 488,874 | 65,408 | 1,458,973 | 103.70 | —51,463 | —150,508 | —122,555 | —13,354 |
| Detroit & Mackinac | Nov. | 385 | 121,461 | 25,682 | 164,747 | 27,489 | 44,192 | 2,202 | 60,132 | 5,453 | 139,331 | 84.60 | 25,416 | 17,630 | 22,896 | 19,344 |
| | 11 mos. | 385 | 1,284,215 | 319,698 | 1,745,472 | 284,078 | 545,307 | 23,901 | 647,142 | 62,968 | 1,562,305 | 89.50 | 183,167 | 72,539 | 65,331 | 62,970 |
| Detroit & Toledo Shore Line | Nov. | 61 | 328,257 | ..... | 333,020 | 34,331 | 34,624 | 2,635 | 105,757 | 6,547 | 183,894 | 55.20 | 149,126 | 122,126 | 44,141 | —85,310 |
| | 11 mos. | 61 | 3,228,182 | ..... | 3,262,852 | 311,118 | 257,055 | 25,386 | 950,522 | 77,180 | 1,621,261 | 49.60 | 1,641,591 | 1,448,531 | 730,670 | 415,437 |
| Detroit, Toledo & Ironton | Nov. | 454 | 747,265 | 10,251 | 775,081 | 180,807 | 220,088 | 7,225 | 324,576 | 24,314 | 750,605 | 96.80 | 24,476 | 11,581 | —138,117 | 29,254 |
| | 11 mos. | 454 | 7,992,745 | 115,115 | 8,242,863 | 1,733,564 | 2,023,416 | 67,084 | 3,036,818 | 225,422 | 7,079,480 | 85.90 | 1,163,383 | 1,023,515 | —306,924 | 374,562 |
| Duluth & Iron Range | Nov. | 278 | 290,385 | 20,353 | 354,869 | 79,657 | 118,668 | 813 | 154,655 | 20,980 | 375,207 | 105.70 | —20,338 | —35,359 | —28,118 | —153,378 |
| | 11 mos. | 280 | 5,941,709 | 184,011 | 6,671,911 | 1,063,794 | 1,179,945 | 12,976 | 1,865,169 | 196,382 | 4,321,346 | 64.80 | 2,350,565 | 1,883,045 | 1,910,254 | 531,738 |
| Duluth, Missabe & Northern | Nov. | 304 | 975,077 | 22,038 | 1,126,291 | 128,354 | 169,681 | 3,285 | 324,126 | 19,361 | 646,454 | 57.40 | 479,837 | 982,415 | 979,463 | —341,522 |
| | 11 mos. | 306 | 13,199,955 | 392,513 | 14,813,541 | 1,781,243 | 1,658,033 | 34,913 | 3,298,423 | 317,917 | 7,009,324 | 47.30 | 7,804,217 | 7,004,348 | 6,971,322 | 4,075,399 |
| Duluth, South Shore & Atlantic | Nov. | 591 | 290,082 | 94,631 | 416,752 | 49,434 | 74,768 | 5,433 | 196,448 | 10,642 | 342,269 | 82.10 | 74,483 | 41,478 | 41,595 | —15,156 |
| | 11 mos. | 591 | 2,697,324 | 975,979 | 4,086,420 | 695,226 | 618,747 | 71,878 | 2,057,511 | 122,462 | 3,623,664 | 88.70 | 462,756 | 111,454 | 69,685 | —520,314 |
| Duluth, Winnipeg & Pacific | Nov. | 178 | 140,533 | 23,839 | 168,823 | 41,424 | 28,851 | 3,612 | 82,215 | 4,574 | 160,676 | 95.20 | 8,147 | —298 | —2,999 | —49,769 |
| | 11 mos. | 178 | 1,525,731 | 227,726 | 1,811,530 | 367,710 | 436,079 | 44,942 | 807,035 | 61,081 | 1,716,784 | 94.70 | 94,746 | —4,806 | —36,359 | —209,410 |
| Elgin, Joliet & Eastern | Nov. | 459 | 1,989,609 | ..... | 2,182,032 | 154,973 | 579,294 | 12,796 | 652,214 | 33,458 | 1,432,240 | 65.60 | 749,792 | 661,458 | 544,286 | 338,984 |
| | 11 mos. | 459 | 17,295,119 | 59 | 19,322,228 | 1,639,788 | 3,868,872 | 133,494 | 6,164,635 | 382,934 | 12,186,363 | 63.10 | 7,135,865 | 6,171,037 | 4,822,000 | 2,815,304 |
| El Paso & Southwestern | Nov. | 1,139 | 751,907 | 157,403 | 962,383 | 149,220 | 207,466 | 34,778 | 279,528 | 44,776 | 724,564 | 75.30 | 237,819 | 190,317 | 225,033 | 36,460 |
| | 11 mos. | 1,139 | 7,852,827 | 1,725,349 | 10,219,646 | 1,706,594 | 1,689,115 | 317,482 | 2,695,672 | 529,590 | 7,027,439 | 68.80 | 3,192,207 | 2,233,990 | 2,078,087 | 1,020,719 |
| Erie | Nov. | 2,039 | 8,093,442 | 971,397 | 9,714,735 | 976,257 | 3,121,292 | 123,498 | 4,102,104 | 265,566 | 8,616,996 | 88.70 | 1,097,739 | 715,141 | 716,341 | 746,891 |
| | 11 mos. | 2,039 | 66,318,417 | 12,034,796 | 85,303,149 | 10,141,748 | 27,601,113 | 1,479,742 | 39,182,362 | 3,103,135 | 81,936,135 | 96.10 | 3,367,014 | 106,253 | 1,366,460 | 6,830,399 |
| Chicago & Erie | Nov. | 269 | 1,064,217 | 52,633 | 1,169,303 | 145,888 | 189,982 | 16,420 | 459,284 | 33,556 | 844,122 | 72.20 | 325,181 | 290,154 | —39,185 | —312,399 |
| | 11 mos. | 269 | 9,086,172 | 648,237 | 10,434,642 | 1,270,829 | 1,797,637 | 211,700 | 4,507,319 | 371,529 | 8,158,695 | 78.20 | 2,275,947 | 1,722,509 | —1,465,199 | —2,721,702 |
| New Jersey & New York | Nov. | 45 | 22,797 | 95,524 | 123,693 | 15,167 | 22,643 | 182 | 67,280 | 3,101 | 108,373 | 87.60 | 15,320 | 12,920 | —14,664 | —13,562 |
| | 11 mos. | 45 | 211,747 | 1,104,384 | 1,372,935 | 180,521 | 251,779 | 13,712 | 764,837 | 37,232 | 1,248,078 | 90.90 | 124,857 | 92,833 | —194,032 | —157,357 |
| New York, Susquehanna & West. | Nov. | 135 | 269,205 | 58,100 | 372,697 | 50,120 | 180,920 | 1,968 | 225,148 | 9,045 | 395,199 | 106.00 | —22,502 | —43,569 | —61,759 | 32,526 |
| | 11 mos. | 135 | 2,599,789 | 671,497 | 3,737,505 | 529,048 | 729,563 | 38,192 | 2,260,935 | 109,234 | 3,667,093 | 98.10 | 70,412 | —199,618 | —318,374 | 19,296 |
| Florida East Coast | Nov. | 764 | 625,551 | 264,377 | 1,005,217 | 175,823 | 216,087 | 9,360 | 352,189 | 27,812 | 788,110 | 78.40 | 217,107 | 142,079 | 109,446 | 13,533 |
| | 11 mos. | 764 | 7,277,408 | 3,422,819 | 12,152,657 | 1,989,150 | 2,223,762 | 142,065 | 3,823,966 | 307,366 | 8,585,187 | 70.60 | 3,567,470 | 2,838,783 | 2,353,768 | 919,062 |
| Fort Smith & Western | Nov. | 249 | 138,473 | 28,196 | 178,640 | 30,320 | 27,686 | 4,623 | 54,182 | 6,479 | 123,996 | 69.40 | 54,644 | 48,834 | 40,433 | 17,235 |
| | 11 mos. | 249 | 1,155,634 | 264,411 | 1,527,346 | 294,310 | 267,056 | 52,456 | 523,219 | 74,684 | 1,220,438 | 79.90 | 306,908 | 241,496 | 148,728 | —73,919 |
| Galveston Wharf | Nov. | 13 | ..... | ..... | 167,060 | 34,842 | 3,685 | 611 | 36,517 | 2,953 | 91,352 | 54.70 | 75,708 | 59,830 | 60,136 | —83,037 |
| | 11 mos. | 13 | ..... | ..... | 1,462,445 | 514,554 | 40,088 | 8,155 | 388,728 | 42,829 | 1,122,372 | 76.70 | 340,073 | 154,219 | 156,520 | 737,644 |
| Georgia | Nov. | 328 | 372,142 | 96,979 | 499,189 | 46,688 | 97,188 | 20,001 | 215,088 | 19,206 | 398,259 | 79.80 | 100,930 | 93,751 | 73,814 | 11,342 |
| | 11 mos. | 328 | 3,283,474 | 1,088,517 | 4,725,349 | 458,252 | 835,056 | 219,032 | 2,227,592 | 210,946 | 3,953,022 | 83.60 | 772,327 | 689,496 | 683,071 | 162,854 |
| Georgia & Florida | Nov. | 405 | 104,535 | 14,024 | 126,065 | 18,881 | 16,116 | 8,260 | 46,925 | 7,139 | 97,540 | 77.40 | 28,525 | 22,291 | 17,877 | —15,001 |
| | 11 mos. | 405 | 1,004,563 | 147,811 | 1,237,648 | 188,607 | 182,182 | 89,866 | 484,227 | 71,269 | 1,018,509 | 82.30 | 219,139 | 149,565 | 81,734 | —211,863 |

# REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1922—CONTINUED

| Name of road. | | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of—Way and structures. | Maintenance of—Equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| Grand Trunk Western | Nov. | 347 | $1,104,494 | $199,283 | $1,393,324 | $138,768 | $264,634 | $25,896 | $571,853 | $47,741 | $1,056,237 | 75.80 | $337,087 | $259,738 | $102,462 | —$33,623 |
| | 11 mos. | 347 | 12,193,380 | 1,841,204 | 14,898,780 | 1,498,465 | 3,212,187 | 299,351 | 6,032,285 | 547,991 | 11,880,559 | 78.30 | 3,238,221 | 2,468,253 | 599,455 | —1,016,451 |
| Atlantic & St. Lawrence | Nov. | 166 | 216,740 | 29,703 | 281,393 | 27,477 | 35,968 | 4,157 | 155,648 | 14,710 | 239,723 | 85.20 | 41,670 | 31,770 | —27,515 | —77,272 |
| | 11 mos. | 166 | 1,900,951 | 420,781 | 2,538,469 | 652,712 | 376,967 | 54,795 | 1,366,094 | 134,684 | 2,604,662 | 102,60 | —66,193 | —241,310 | —904,832 | —1,285,010 |
| Chicago, Det. & Can. Gr. Tr. Jct. | Nov. | 59 | 200,786 | 9,094 | 245,884 | 13,511 | 12,898 | 3,162 | 68,225 | 3,348 | 101,114 | 41.10 | 144,770 | 131,455 | 114,050 | —28,475 |
| | 11 mos. | 59 | 1,795,930 | 94,067 | 2,083,311 | 154,889 | 140,022 | 37,612 | 724,692 | 38,870 | 1,095,879 | 52.60 | 987,432 | 871,266 | 677,231 | 223,010 |
| Detroit, Grand Haven & Milw'k. | Nov. | 189 | 439,886 | 36,958 | 529,223 | 54,682 | 48,615 | 7,926 | 232,101 | 14,794 | 358,358 | 67.70 | 170,866 | 186,910 | 99,784 | —10,551 |
| | 11 mos. | 189 | 4,188,212 | 401,700 | 4,957,147 | 350,467 | 529,179 | 92,939 | 2,374,852 | 175,991 | 3,726,530 | 78,20 | 1,230,617 | 1,172,662 | 480,511 | —474,196 |
| Great Northern | Nov. | 8,255 | 8,340,383 | 1,289,352 | 10,503,818 | 957,594 | 1,730,968 | 123,934 | 4,131,477 | 202,886 | 7,207,681 | 68.60 | 3,296,137 | 2,601,208 | 3,005,742 | 3,410,066 |
| | 11 mos. | 8,261 | 71,849,302 | 13,760,121 | 94,919,372 | 12,327,506 | 18,184,478 | 1,492,869 | 38,058,654 | 2,276,158 | 72,880,408 | 76.80 | 22,038,964 | 14,507,565 | 15,811,311 | 11,610,475 |
| Green Bay & Western | Nov. | 262 | 86,703 | 11,135 | 106,600 | 23,040 | 27,317 | 2,493 | 44,320 | 2,870 | 99,917 | 93.70 | 6,683 | —1,317 | 4,331 | 15,182 |
| | 11 mos. | 262 | 984,951 | 164,291 | 1,242,845 | 236,685 | 198,517 | 26,993 | 479,753 | 28,956 | 970,652 | 78.10 | 272,193 | 183,882 | 151,123 | 134,382 |
| Gulf Coast Lines | Nov. | 1,173 | 691,245 | 171,364 | 910,670 | 149,431 | 135,624 | 26,925 | 257,690 | 33,704 | 602,157 | 66.10 | 308,513 | 268,104 | 261,619 | 183,250 |
| | 11 mos. | 1,173 | 7,107,342 | 1,733,892 | 9,472,120 | 1,517,578 | 1,460,351 | 289,894 | 2,625,894 | 382,102 | 6,363,634 | 67.50 | 3,108,486 | 2,682,998 | 2,579,541 | 1,947,046 |
| Gulf & Ship Island | Nov. | 307 | 183,478 | 34,464 | 233,043 | 45,277 | 28,512 | 6,586 | 81,032 | 11,658 | 173,325 | 74.40 | 59,718 | 35,389 | 44,617 | 11,845 |
| | 11 mos. | 307 | 2,098,302 | 426,812 | 2,698,026 | 494,749 | 398,657 | 83,820 | 838,546 | 127,310 | 1,946,841 | 72.20 | 751,185 | 539,940 | 508,836 | 216,002 |
| Gulf, Mobile & Northern | Nov. | 436 | 383,913 | 34,282 | 434,311 | 56,862 | 71,206 | 13,368 | 164,722 | 13,719 | 319,877 | 73.60 | 144,434 | 77,888 | 74,432 | 38,921 |
| | 11 mos. | 436 | 3,566,574 | 370,732 | 4,108,480 | 600,894 | 682,443 | 155,751 | 1,422,012 | 168,052 | 3,019,886 | 73.50 | 1,088,594 | 824,759 | 701,167 | 79,347 |
| Hocking Valley | Nov. | 348 | 1,185,364 | 89,394 | 1,383,658 | 139,687 | 592,348 | 11,117 | 459,452 | 31,327 | 1,233,907 | 89.20 | 149,751 | 64,507 | 71,649 | 367,280 |
| | 11 mos. | 348 | 10,516,219 | 971,130 | 12,558,373 | 1,271,753 | 3,669,763 | 128,233 | 4,275,887 | 340,296 | 9,675,165 | 77.00 | 2,883,208 | 1,909,112 | 2,008,887 | 1,196,637 |
| Illinois Central | Nov. | 4,784 | 11,501,216 | 2,002,070 | 14,421,551 | 2,116,770 | 4,067,997 | 208,119 | 5,121,835 | 281,294 | 11,843,060 | 82.10 | 2,578,491 | 1,686,386 | 1,689,493 | 761,181 |
| | 11 mos. | 4,784 | 108,903,495 | 21,758,929 | 140,444,576 | 18,698,579 | 33,133,355 | 2,087,438 | 50,718,206 | 3,317,580 | 108,431,669 | 77.20 | 32,012,907 | 21,760,055 | 22,202,780 | 16,455,579 |
| Yazoo & Miss. Valley | Nov. | 1,380 | 1,620,068 | 430,113 | 2,146,562 | 424,885 | 395,800 | 25,135 | 709,203 | 45,443 | 1,596,071 | 74.40 | 550,491 | 433,219 | 422,764 | 286,090 |
| | 11 mos. | 1,381 | 13,123,309 | 3,642,240 | 17,832,570 | 4,123,143 | 3,506,788 | 288,342 | 6,954,459 | 527,450 | 15,385,789 | 86.30 | 2,447,781 | 1,148,457 | 1,085,598 | 716,309 |
| Illinois Central (inc. Y. & M. V.) | Nov. | 6,164 | 13,121,344 | 2,432,183 | 16,568,113 | 2,541,655 | 4,463,797 | 233,254 | 5,831,038 | 326,737 | 13,439,131 | 81.10 | 3,128,982 | 2,119,605 | 2,112,257 | 1,047,271 |
| | 11 mos. | 6,165 | 122,026,804 | 25,401,169 | 158,277,146 | 22,821,722 | 36,640,143 | 2,375,780 | 57,672,665 | 3,845,030 | 123,816,458 | 78.20 | 34,460,688 | 22,908,512 | 23,288,378 | 17,171,888 |
| International & Great Northern | Nov. | 1,159 | 1,035,861 | 198,915 | 1,359,020 | 276,819 | 298,093 | 26,701 | 569,044 | 44,718 | 1,219,006 | 89.70 | 140,014 | 107,244 | 40,931 | —93,303 |
| | 11 mos. | 1,159 | 9,770,457 | 2,256,109 | 13,375,587 | 2,068,952 | 2,472,553 | 292,923 | 5,722,335 | 513,567 | 11,128,859 | 83.20 | 2,247,028 | 1,873,515 | 1,228,654 | —307,695 |
| Kansas City, Mexico & Orient | Nov. | 272 | 111,571 | 7,913 | 126,436 | 22,160 | 22,870 | 4,898 | 75,315 | 5,337 | 130,580 | 103.20 | —4,144 | —12,488 | —10,468 | —2,915 |
| | 11 mos. | 272 | 1,037,348 | 108,562 | 1,235,784 | 274,025 | 257,548 | 52,096 | 677,516 | 64,861 | 1,326,046 | 107.30 | —90,262 | —179,974 | —183,506 | —216,659 |
| Kans. City, Mex. & Orient of Tex. | Nov. | 465 | 158,226 | 12,720 | 178,554 | 17,303 | 26,028 | 4,992 | 89,172 | 6,031 | 143,526 | 80.40 | 35,028 | 28,322 | 11,331 | 20,696 |
| | 11 mos. | 465 | 1,197,932 | 124,395 | 1,404,659 | 257,631 | 321,484 | 52,017 | 808,097 | 70,249 | 1,509,478 | 107.40 | —104,819 | —172,397 | —335,416 | —524,600 |
| Kansas City Southern | Nov. | 767 | 1,338,460 | 156,542 | 1,631,233 | 211,494 | 404,107 | 36,753 | 557,489 | 61,506 | 1,271,523 | 77.90 | 359,710 | 252,565 | 182,201 | 215,860 |
| | 11 mos. | 767 | 13,156,745 | 1,827,810 | 16,473,406 | 2,148,216 | 3,456,767 | 399,965 | 5,866,229 | 733,915 | 12,593,799 | 76.50 | 3,874,607 | 2,788,952 | 2,499,363 | 3,751,475 |
| Texarkanna & Ft. Smith | Nov. | 81 | 167,209 | 13,587 | 197,595 | 15,644 | 25,865 | 5,766 | 52,586 | 8,352 | 108,209 | 54.80 | 89,386 | 78,472 | 39,715 | 39,998 |
| | 11 mos. | 81 | 1,611,941 | 157,158 | 1,934,159 | 193,987 | 223,461 | 57,868 | 557,787 | 94,550 | 1,126,303 | 58.20 | 807,856 | 690,021 | 477,610 | 412,430 |
| Kansas, Oklahoma & Gulf | Nov. | 314 | 260,222 | 14,724 | 283,898 | 39,897 | 44,340 | 8,015 | 96,058 | 10,456 | 198,930 | 70.10 | 84,968 | 75,278 | 60,330 | 7,624 |
| | 11 mos. | 314 | 2,406,387 | 138,777 | 2,646,373 | 483,040 | 284,950 | 63,404 | 935,710 | 112,264 | 1,881,258 | 71.10 | 765,115 | 657,211 | 512,631 | —42,173 |
| Lake Superior & Ishpeming | Nov. | 33 | 38,932 | 71 | 45,279 | 14,676 | 12,292 | 217 | 17,632 | 2,736 | 47,553 | 105.00 | —2,274 | —7,760 | —4,661 | —15,310 |
| | 11 mos. | 33 | 894,770 | 723 | 1,065,616 | 222,100 | 111,256 | 2,488 | 238,332 | 28,869 | 603,045 | 56.60 | 462,571 | 400,813 | 417,173 | —169,655 |
| Lake Terminal | Nov. | 13 | ..... | ..... | 82,445 | 13,112 | 19,533 | ..... | 52,877 | 1,627 | 87,149 | 105.70 | —4,704 | —8,844 | —10,449 | 37,594 |
| | 11 mos. | 13 | ..... | ..... | 961,931 | 107,797 | 110,352 | ..... | 497,586 | 18,165 | 733,900 | 76.30 | 228,031 | 169,186 | 241,659 | 152,362 |
| Lehigh & Hudson River | Nov. | 96 | 212,913 | 3,202 | 227,110 | 26,436 | 37,596 | 1,282 | 98,037 | 7,989 | 171,340 | 75.40 | 55,770 | 43,770 | 37,242 | 59,786 |
| | 11 mos. | 96 | 2,043,066 | 42,360 | 2,201,571 | 295,657 | 401,572 | 15,955 | 989,119 | 85,735 | 1,787,993 | 81.20 | 413,578 | 268,177 | 96,205 | 426,181 |
| Lehigh & New England | Nov. | 235 | 603,252 | 2,003 | 612,100 | 44,083 | 79,434 | 4,825 | 196,931 | 14,907 | 338,827 | 55.40 | 273,273 | 224,535 | 187,017 | 73,065 |
| | 11 mos. | 236 | 3,949,342 | 20,927 | 4,049,604 | 592,478 | 997,803 | 99,255 | 1,456,850 | 174,617 | 3,318,952 | 82.00 | 730,652 | 550,369 | 578,046 | 930,226 |
| Lehigh Valley | Nov. | 1,335 | 4,654,222 | 528,798 | 5,602,080 | 558,394 | 1,748,455 | 99,395 | 2,708,626 | 120,883 | 5,258,907 | 93.90 | 343,173 | 166,728 | 100,813 | 1,205,883 |
| | 11 mos. | 1,334 | 46,177,891 | 6,420,915 | 56,924,124 | 6,652,015 | 17,896,115 | 1,144,168 | 26,698,806 | 1,376,746 | 54,031,026 | 94.90 | 2,893,098 | 955,928 | 205,780 | 5,030,116 |
| Los Angeles & Salt Lake | Nov. | 1,137 | 1,351,400 | 441,244 | 1,954,600 | 211,345 | 432,947 | 48,035 | 638,877 | 40,511 | 1,418,679 | 72.60 | 535,921 | 426,506 | 383,152 | 227,071 |
| | 11 mos. | 1,140 | 11,692,405 | 4,841,216 | 18,101,935 | 3,550,480 | 4,046,762 | 610,286 | 5,918,734 | 465,552 | 15,005,767 | 82.90 | 3,096,168 | 1,879,088 | 1,445,519 | 1,420,831 |
| Louisiana & Arkansas | Nov. | 302 | 242,698 | 32,328 | 282,697 | 42,024 | 44,358 | 7,265 | 79,595 | 9,793 | 182,922 | 64.70 | 99,775 | 77,735 | 81,779 | 54,214 |
| | 11 mos. | 302 | 2,547,448 | 357,322 | 2,989,881 | 579,960 | 432,021 | 83,858 | 916,849 | 92,825 | 2,100,293 | 70.20 | 889,588 | 648,286 | 641,738 | 344,684 |
| Louisiana Ry. & Navigation Co. | Nov. | 343 | 319,172 | 35,758 | 380,058 | 66,497 | 85,492 | 10,532 | 134,116 | 10,794 | 307,222 | 80.80 | 72,836 | 46,786 | 8,541 | —15,962 |
| | 11 mos | 343 | 2,750,487 | 348,300 | 3,269,840 | 689,519 | 523,471 | 112,962 | 1,256,165 | 124,294 | 2,704,815 | 82.70 | 565,025 | 376,125 | 77,677 | 307,461 |
| Louisville & Nashville | Nov. | 5,038 | 7,439,945 | 1,910,653 | 10,012,472 | 1,347,271 | 2,295,459 | 193,916 | 4,202,861 | 216,061 | 8,300,496 | 82.90 | 1,711,976 | 1,308,749 | 1,335,111 | 1,061,041 |
| | 11 mos. | 5,038 | 83,110,038 | 20,561,675 | 110,769,621 | 15,582,054 | 27,543,787 | 2,317,974 | 42,546,236 | 2,472,097 | 90,943,469 | 82.10 | 19,826,152 | 15,522,223 | 16,267,595 | 4,200,814 |
| Louisville, Henderson & St. Louis | Nov. | 199 | 179,458 | 62,004 | 256,742 | 56,933 | 63,964 | 6,484 | 92,713 | 7,969 | 228,063 | 88.80 | 28,679 | —18,754 | —38,539 | 6,623 |
| | 11 mos. | 199 | 2,102,949 | 653,731 | 2,980,217 | 596,857 | 391,105 | 68,464 | 1,014,310 | 90,365 | 2,161,101 | 72.50 | 819,116 | 628,356 | 459,110 | 270,361 |
| Maine Central | Nov. | 1,194 | 1,321,515 | 327,479 | 1,783,048 | 232,604 | 362,475 | 12,515 | 828,606 | 50,943 | 1,490,705 | 83.60 | 292,343 | 144,044 | 222,379 | —35,693 |
| | 11 mos. | 1,194 | 13,108,642 | 4,211,643 | 18,750,207 | 2,968,859 | 3,474,437 | 150,624 | 8,321,245 | 523,266 | 15,470,809 | 82.50 | 3,279,398 | 2,184,619 | 2,253,074 | —312,750 |
| Midland Valley | Nov. | 365 | 334,808 | 72,125 | 426,587 | 173,720 | 45,000 | 5,653 | 142,459 | 14,851 | 381,651 | 89.50 | 44,936 | 28,094 | 19,213 | 68,741 |
| | 11 mos. | 365 | 3,302,829 | 780,942 | 4,272,069 | 812,133 | 493,871 | 54,926 | 1,297,140 | 162,866 | 2,811,735 | 65.60 | 1,460,334 | 1,294,643 | 1,186,764 | 777,267 |
| Minneapolis & St. Louis | Nov. | 1,649 | 1,153,844 | 142,352 | 1,371,644 | 176,534 | 292,423 | 24,338 | 648,577 | 43,757 | 1,185,690 | 86.40 | 185,954 | 106,397 | 104,806 | 206,815 |
| | 11 mos. | 1,649 | 11,835,575 | 1,663,936 | 14,284,078 | 1,944,768 | 2,560,171 | 262,211 | 6,740,002 | 439,535 | 11,944,993 | 83.60 | 2,339,080 | 1,581,372 | 1,069,661 | 101,238 |
| Minneapolis, St. Paul & S. S. Marie | Nov. | 4,383 | 3,598,115 | 603,727 | 4,579,916 | 615,237 | 711,381 | 59,108 | 2,175,912 | 102,158 | 3,683,145 | 80.40 | 896,771 | 597,828 | 590,332 | 480,318 |
| | 11 mos. | 4,383 | 32,308,008 | 6,732,125 | 42,902,214 | 6,259,447 | 6,837,419 | 667,829 | 18,246,162 | 1,143,776 | 33,297,104 | 77.60 | 9,605,110 | 6,781,212 | 6,361,300 | —177,865 |
| Mississippi Central | Nov. | 258 | 195,993 | 15,653 | 138,370 | 28,432 | 22,061 | 6,006 | 45,649 | 6,598 | 108,746 | 78.60 | 29,624 | 24,364 | 35,560 | —18,024 |
| | 11 mos. | 259 | 1,129,476 | 182,048 | 1,369,623 | 226,227 | 335,829 | 63,211 | 475,801 | 76,276 | 1,177,344 | 86.00 | 192,279 | 124,541 | 157,528 | —117,975 |

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1922—CONTINUED

| Name of road. | | Average mileage operated during period. | Operating revenues: Freight. | Passenger. | Total (inc. misc.) | Operating expenses: Maintenance of Way and structures. | Maintenance of Equipment. | Traffic. | Transportation. | General. | Total. | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Missouri & North Arkansas | Nov. | 354 | $100,236 | $23,232 | $132,796 | $14,333 | $10,205 | $1,625 | $52,873 | $4,933 | $83,469 | 62.80 | $49,327 | $46,007 | $41,818 | ..... |
| | 11 mos. | 317 | 468,257 | 112,705 | 624,577 | 57,331 | 64,221 | 11,665 | 313,635 | 24,147 | 470,499 | 75.30 | 154,078 | 143,417 | 80,818 | ..... |
| Missouri, Kansas & Texas | Nov. | 1,670 | 2,278,190 | 485,299 | 2,995,789 | 347,449 | 643,752 | 42,912 | 912,623 | 79,809 | 2,035,316 | 67.90 | 960,473 | 726,115 | 802,161 | $798,278 |
| | 11 mos. | 1,670 | 21,174,021 | 5,145,102 | 28,935,079 | 3,175,530 | 5,939,003 | 499,673 | 8,727,484 | 961,512 | 19,381,565 | 67.00 | 9,553,524 | 7,593,661 | 8,251,046 | 5,856,949 |
| Mo., Kans. & Tex. of Texas | Nov. | 1,738 | 1,468,022 | 385,171 | 1,991,156 | 308,947 | 403,416 | 36,676 | 754,286 | 66,814 | 1,574,666 | 79.10 | 416,490 | 329,374 | 25,384 | 136,131 |
| | 11 mos. | 1,737 | 13,264,678 | 4,552,287 | 19,522,405 | 3,128,046 | 3,344,935 | 437,907 | 7,632,380 | 805,446 | 15,327,152 | 78.50 | 4,195,253 | 3,579,417 | 1,378,655 | 2,566,065 |
| Wichita Falls & Northwestern | Nov. | 329 | 127,516 | 19,516 | 155,608 | 37,919 | 19,925 | 477 | 50,427 | 6,510 | 114,747 | 73.70 | 40,861 | 30,012 | 6,586 | —12,201 |
| | 11 mos. | 329 | 1,086,972 | 241,082 | 1,434,775 | 323,849 | 189,606 | 9,496 | 570,860 | 89,791 | 1,179,664 | 82.20 | 255,111 | 127,553 | —88,046 | 482,087 |
| Missouri Pacific | Nov. | 7,148 | 6,657,876 | 1,477,243 | 8,884,393 | 1,442,048 | 2,164,928 | 137,067 | 3,549,498 | 248,788 | 7,569,510 | 85.20 | 1,314,883 | 1,000,716 | 710,517 | 1,155,648 |
| | 11 mos. | 7,272 | 67,648,490 | 15,241,751 | 91,194,536 | 15,853,474 | 19,015,956 | 1,678,072 | 37,354,053 | 2,830,949 | 76,987,526 | 84.40 | 14,207,010 | 10,209,327 | 6,723,721 | 9,972,570 |
| Mobile & Ohio | Nov. | 1,165 | 1,537,089 | 167,867 | 1,798,382 | 178,413 | 469,363 | 37,002 | 632,630 | 45,344 | 1,363,057 | 75.80 | 435,325 | 346,318 | 332,576 | 100,465 |
| | 11 mos. | 1,165 | 13,818,231 | 1,614,544 | 16,292,463 | 1,922,373 | 3,520,211 | 470,252 | 6,177,021 | 516,760 | 12,616,223 | 77.40 | 3,676,240 | 2,898,392 | 2,446,372 | 996,444 |
| Monongahela | Nov. | 106 | 367,589 | 41,130 | 415,826 | 49,390 | 85,722 | 1,479 | 138,312 | 9,477 | 284,380 | 68.40 | 131,446 | 118,946 | 56,223 | 150,478 |
| | 11 mos. | 106 | 2,897,918 | 359,302 | 3,315,948 | 456,079 | 589,515 | 15,824 | 980,379 | 102,473 | 2,144,270 | 64.70 | 1,171,678 | 1,079,014 | 615,125 | 609,958 |
| Monongahela Connecting | Nov. | 7 | ..... | ..... | 167,910 | 25,086 | 28,893 | 561 | 98,659 | 14,540 | 167,739 | 99.90 | 171 | —2,366 | —13,832 | 12,186 |
| | 11 mos. | 7 | ..... | ..... | 1,512,598 | 211,272 | 272,397 | 5,809 | 741,721 | 83,528 | 1,314,727 | 86.90 | 197,871 | 173,899 | 120,407 | —75,693 |
| Montour | Nov. | 56 | 184,930 | 448 | 187,718 | 33,482 | 36,930 | 1,041 | 35,375 | 7,164 | 113,992 | 60.70 | 73,726 | 61,409 | 89,552 | 13,649 |
| | 11 mos. | 56 | 977,771 | 7,404 | 997,342 | 222,572 | 293,612 | 11,142 | 235,271 | 68,953 | 831,550 | 83.40 | 165,792 | 121,760 | 240,681 | 186,356 |
| Nashville, Chattanooga & St. Louis | Nov. | 1,258 | 1,544,060 | 380,606 | 2,066,580 | 317,875 | 478,965 | 83,921 | 808,487 | 61,433 | 1,754,778 | 84.90 | 311,802 | 276,344 | 304,744 | 56,612 |
| | 11 mos. | 1,258 | 14,676,920 | 4,218,593 | 20,352,901 | 3,138,872 | 5,064,517 | 752,939 | 8,033,713 | 646,302 | 17,685,322 | 86.90 | 2,667,579 | 2,265,694 | 2,611,356 | 1,348,474 |
| Nevada Northern | Nov. | 165 | 52,763 | 5,555 | 61,516 | 9,876 | 6,946 | 451 | 11,891 | 3,089 | 32,253 | 52.40 | 29,724 | 21,724 | 22,312 | 1,871 |
| | 11 mos | 165 | 438,343 | 49,422 | 531,499 | 108,847 | 48,263 | 4,768 | 99,490 | 32,201 | 293,569 | 55.20 | 237,930 | 166,250 | 180,870 | —91,569 |
| Newburgh & South Shore | Nov. | 7 | ..... | ..... | 179,919 | 20,007 | 45,862 | ..... | 73,897 | 3,856 | 143,622 | 79.80 | 36,297 | 23,491 | 19,724 | 67,592 |
| | 11 mos. | 7 | ..... | ..... | 1,766,984 | 160,168 | 417,820 | ..... | 709,253 | 40,809 | 1,328,050 | 75.20 | 438,934 | 300,740 | 269,730 | 168,098 |
| New Orleans Great Northern | Nov. | 274 | 174,106 | 27,812 | 212,027 | 29,315 | 23,711 | 4,122 | 65,066 | 8,935 | 131,121 | 61.80 | 80,906 | 65,317 | 72,915 | —25,433 |
| | 11 mos. | 274 | 1,831,624 | 388,356 | 2,323,731 | 345,715 | 319,221 | 56,618 | 735,790 | 106,754 | 1,566,103 | 67.40 | 757,628 | 590,789 | 556,921 | —15,216 |
| New York Central | Nov. | 6,893 | 25,171,096 | 7,016,037 | 36,389,112 | 3,611,706 | 8,722,094 | 413,622 | 13,153,814 | 750,059 | 27,014,225 | 74.20 | 9,374,887 | 6,943,445 | 6,936,833 | 7,264,906 |
| | 11 mos. | 6,893 | 205,464,723 | 83,452,239 | 328,143,397 | 38,006,845 | 85,981,670 | 3,763,876 | 122,899,122 | 8,652,960 | 263,124,466 | 80.10 | 65,018,931 | 45,328,310 | 46,934,288 | 47,132,617 |
| Cincinnati Northern | Nov. | 244 | 372,334 | 12,571 | 393,000 | 49,710 | 69,885 | 4,727 | 108,317 | 8,525 | 239,911 | 61.00 | 153,089 | 134,310 | 105,514 | 15,781 |
| | 11 mos. | 244 | 2,912,155 | 161,503 | 3,159,666 | 613,119 | 604,359 | 54,971 | 1,078,285 | 89,458 | 2,434,438 | 77.00 | 725,228 | 555,687 | 327,402 | 671,618 |
| Indiana Harbor Belt | Nov. | 119 | ..... | ..... | 905,535 | 90,207 | 105,305 | 4,720 | 473,631 | 18,799 | 692,662 | 76.50 | 212,873 | 184,611 | 54,104 | 57,794 |
| | 11 mos. | 119 | ..... | ..... | 9,377,808 | 1,102,518 | 1,046,725 | 46,028 | 3,798,278 | 210,627 | 6,204,176 | 66.20 | 3,173,632 | 2,751,624 | 1,731,039 | 453,077 |
| Michigan Central | Nov. | 1,862 | 5,672,148 | 1,525,844 | 7,999,148 | 904,644 | 1,553,431 | 108,992 | 2,523,839 | 129,030 | 5,287,701 | 66.10 | 2,711,447 | 2,192,008 | 2,057,902 | 896,831 |
| | 11 mos. | 1,862 | 50,577,003 | 17,429,599 | 75,609,332 | 8,056,305 | 16,450,138 | 1,017,599 | 25,980,390 | 1,539,394 | 53,810,482 | 71.20 | 21,798,850 | 17,265,642 | 16,209,902 | 12,867,472 |
| Pittsburgh & Lake Erie | Nov. | 227 | 3,231,239 | 248,900 | 3,577,555 | 298,635 | 865,663 | 28,737 | 935,357 | 63,259 | 2,193,087 | 61.30 | 1,384,468 | 1,176,814 | 1,541,038 | 325,404 |
| | 11 mos. | 227 | 22,424,331 | 2,548,317 | 25,835,793 | 2,990,735 | 9,656,913 | 229,919 | 8,601,768 | 678,325 | 22,181,001 | 85.90 | 3,654,792 | 2,548,799 | 4,224,805 | 1,747,467 |
| New York, Chicago & St. Louis | Nov. | 1,242 | 3,095,668 | 141,098 | 3,386,177 | 373,826 | 938,758 | 88,375 | 1,394,862 | 113,554 | 2,916,206 | 86.10 | 469,971 | 253,425 | 210,130 | 502,403 |
| | 11 mos. | 1,242 | 32,909,429 | 1,614,347 | 35,723,635 | 4,371,835 | 7,281,477 | 858,322 | 13,643,323 | 1,243,974 | 27,466,756 | 76.90 | 8,256,879 | 6,224,747 | 5,909,050 | 4,087,282 |
| New York, New Haven & Hartford | Nov. | 2,000 | 5,598,107 | 4,041,251 | 10,941,894 | 1,216,766 | 2,764,901 | 54,767 | 4,663,378 | 284,660 | 9,194,021 | 84.00 | 1,747,873 | 1,325,967 | 432,313 | 1,524,730 |
| | 11 mos. | 2,002 | 54,831,911 | 44,814,856 | 112,429,072 | 15,319,207 | 23,841,398 | 610,478 | 46,213,819 | 3,109,723 | 90,860,256 | 80.80 | 21,568,816 | 17,277,099 | 11,414,412 | —8,498 |
| Central of New England | Nov. | 295 | 626,340 | 14,039 | 666,304 | 96,445 | 56,610 | 4,454 | 235,985 | 10,438 | 404,581 | 60.70 | 261,723 | 239,545 | 141,573 | 269,597 |
| | 11 mos. | 295 | 5,694,313 | 206,921 | 6,205,504 | 1,313,667 | 967,002 | 47,562 | 2,260,360 | 122,091 | 4,710,407 | 75.90 | 1,495,097 | 1,248,175 | 764,461 | 1,218,885 |
| New York, Ontario & Western | Nov. | 569 | 786,336 | 99,238 | 1,035,893 | 147,685 | 300,281 | 18,630 | 615,426 | 29,970 | 1,112,772 | 107.40 | —76,879 | —116,902 | —193,010 | 54,993 |
| | 11 mos. | 569 | 6,570,546 | 2,904,837 | 11,336,472 | 1,616,972 | 2,230,136 | 176,358 | 5,587,641 | 330,582 | 9,960,101 | 87.90 | 1,376,371 | 979,069 | 497,239 | 1,276,053 |
| Norfolk & Western | Nov. | 2,237 | 5,638,554 | 748,491 | 6,716,216 | 1,304,713 | 2,487,755 | 77,851 | 2,662,969 | 144,313 | 6,699,690 | 99.80 | 16,526 | —433,606 | —170,627 | 1,922,131 |
| | 11 mos. | 2,237 | 71,952,883 | 8,280,939 | 63,353,990 | 11,539,133 | 21,294,023 | 860,418 | 26,413,399 | 1,618,611 | 61,865,356 | 74.20 | 21,437,634 | 15,929,321 | 17,981,791 | 12,731,135 |
| Norfolk Southern | Nov. | 930 | 635,045 | 108,618 | 785,463 | 95,171 | 119,390 | 22,268 | 322,631 | 25,168 | 585,059 | 74.50 | 200,404 | 168,089 | 134,500 | 108,748 |
| | 11 mos. | 930 | 5,928,487 | 1,325,784 | 7,678,470 | 1,103,486 | 1,221,098 | 240,985 | 3,191,601 | 320,062 | 6,074,467 | 79.10 | 1,604,003 | 1,261,522 | 986,298 | 624,776 |
| Northern Pacific | Nov. | 6,631 | 7,426,658 | 1,202,139 | 9,433,995 | 986,644 | 2,207,968 | 128,773 | 3,636,979 | 202,330 | 7,215,923 | 76.50 | 2,218,072 | 1,473,423 | 2,061,551 | 1,417,726 |
| | 11 mos. | 6,641 | 65,541,888 | 14,194,132 | 87,733,885 | 11,881,145 | 20,739,243 | 1,525,119 | 33,372,061 | 2,326,884 | 70,782,288 | 80.70 | 16,951,597 | 8,944,171 | 12,631,040 | 8,838,299 |
| Northwestern Pacific | Nov. | 496 | 347,362 | 177,804 | 604,015 | 112,348 | 123,410 | 5,339 | 241,769 | 14,598 | 499,368 | 82.70 | 104,647 | 56,970 | 49,345 | 42,265 |
| | 11 mos. | 500 | 4,112,548 | 2,443,687 | 7,421,541 | 1,118,225 | 1,030,603 | 76,375 | 2,814,688 | 161,374 | 5,218,546 | 70.30 | 2,202,995 | 1,678,187 | 1,517,684 | 1,637,116 |
| Pennsylvania | Nov. | 10,537 | 41,826,279 | 11,959,308 | 59,410,370 | 6,995,393 | 15,760,732 | 582,962 | 24,461,488 | 1,379,047 | 49,999,104 | 84.20 | 9,411,266 | 7,014,120 | 5,886,402 | 7,070,461 |
| | 11 mos. | 10,537 | 401,689,652 | 133,992,239 | 588,907,546 | 72,626,183 | 151,628,986 | 6,336,035 | 231,385,026 | 14,722,855 | 485,512,634 | 82.40 | 103,394,912 | 75,927,547 | 67,131,599 | 36,700,260 |
| Balti., Chesapeake & Atlantic | Nov. | 87 | 75,461 | 29,785 | 109,767 | 9,312 | 21,152 | 1,180 | 86,156 | 3,148 | 120,948 | 110.20 | —11,181 | —11,183 | —12,515 | —5,345 |
| | 11 mos. | 87 | 970,048 | 433,242 | 1,464,395 | 152,986 | 354,720 | 20,343 | 882,376 | 40,682 | 1,451,112 | 99.10 | 13,283 | —34,479 | —37,473 | 89,691 |
| Long Island | Nov. | 397 | 839,861 | 1,306,771 | 2,377,497 | 257,991 | 415,323 | 18,319 | 1,130,046 | 57,371 | 1,894,503 | 79.70 | 482,994 | 380,547 | 256,893 | 229,146 |
| | 11 mos. | 397 | 8,137,911 | 17,889,380 | 28,573,099 | 3,019,910 | 4,663,222 | 198,614 | 12,409,556 | 628,573 | 21,144,071 | 74.00 | 7,429,028 | 5,802,034 | 4,965,892 | 3,378,975 |
| Maryland, Dela. & Va | Nov. | 82 | 64,589 | 19,752 | 87,818 | 8,424 | 26,848 | 819 | 77,228 | 2,112 | 115,431 | 131.40 | —27,613 | —27,615 | —28,959 | —17,604 |
| | 11 mos. | 82 | 706,180 | 340,740 | 1,084,514 | 106,644 | 265,442 | 19,916 | 745,922 | 27,014 | 1,164,938 | 107.40 | —80,424 | —100,833 | —114,241 | —76,968 |

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF OCTOBER AND TEN MONTHS OF CALENDAR YEAR 1922—CONTINUED

| Name of road. | | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of Way and structures. | Maintenance of Equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| West Jersey & Seashore | Nov. | 359 | $485,054 | $425,015 | $988,365 | $177,087 | $192,426 | $12,506 | $485,455 | $26,418 | $905,102 | 91.60 | $83,263 | $83,203 | $62,027 | —$57,859 |
| | 11 mos. | 359 | 4,677,303 | 7,357,069 | 13,047,297 | 1,870,114 | 2,302,698 | 183,905 | 5,867,052 | 310,556 | 10,672,616 | 81.80 | 2,374,681 | 1,520,479 | 1,276,890 | 508,121 |
| Peoria & Pekin Union | Nov. | 19 | 31,058 | 2,315 | 148,756 | 28,806 | 16,830 | 516 | 72,195 | 9,237 | 127,634 | 71.40 | 51,122 | 31,122 | 55,506 | 7,190 |
| | 11 mos. | 19 | 183,089 | 39,569 | 1,679,380 | 289,555 | 156,363 | 3,070 | 705,126 | 98,760 | 1,252,874 | 74.60 | 426,506 | 255,006 | 533,932 | 172,860 |
| Pere Marquette | Nov. | 2,212 | 2,773,496 | 326,993 | 3,420,598 | 415,769 | 713,117 | 45,934 | 1,373,714 | 107,766 | 2,661,736 | 77.80 | 758,862 | 595,156 | 419,742 | 339,753 |
| | 11 mos. | 2,217 | 27,251,301 | 4,495,206 | 35,007,603 | 4,138,233 | 6,852,441 | 563,321 | 13,345,729 | 1,147,973 | 26,113,588 | 74.60 | 8,894,015 | 7,263,605 | 5,786,758 | 5,567,180 |
| Philadelphia & Reading | Nov. | 1,125 | 7,269,459 | 833,296 | 8,521,783 | 643,102 | 1,584,811 | 63,347 | 3,085,136 | 143,552 | 5,614,864 | 66.00 | 2,906,919 | 2,738,226 | 2,570,130 | 1,508,813 |
| | 11 mos. | 1,126 | 59,945,626 | 9,037,558 | 73,076,125 | 8,048,698 | 18,052,724 | 684,769 | 27,709,657 | 1,595,993 | 56,252,432 | 77.00 | 16,823,693 | 14,721,093 | 12,600,037 | 10,410,538 |
| Atlantic City | Nov. | 176 | 118,379 | 131,220 | 261,311 | 69,130 | 43,996 | 3,649 | 225,969 | 4,348 | 347,069 | 132.80 | —85,758 | —107,324 | —144,083 | —88,508 |
| | 11 mos. | 176 | 1,357,272 | 2,875,210 | 4,367,727 | 709,212 | 413,644 | 71,251 | 2,529,766 | 51,524 | 3,773,607 | 86.40 | 594,120 | 373,145 | —65,437 | 131,972 |
| Perkiomen | Nov. | 41 | 94,916 | 5,831 | 104,769 | 6,154 | 3,672 | 107 | 38,689 | 865 | 49,521 | 47.30 | 55,248 | 50,436 | 45,633 | 50,764 |
| | 11 mos. | 41 | 1,048,936 | 89,678 | 1,179,551 | 79,840 | 45,282 | 1,186 | 473,569 | 9,980 | 610,244 | 51.70 | 569,307 | 513,537 | 449,542 | 420,041 |
| Port Reading | Nov. | 21 | 146,760 | ..... | 189,547 | 22,726 | 4,640 | 229 | 68,542 | 2,025 | 98,162 | 51.80 | 91,385 | 84,429 | 44,756 | 2,792 |
| | 11 mos. | 21 | 1,195,233 | ..... | 1,651,811 | 209,537 | 117,520 | 2,519 | 601,766 | 19,236 | 950,576 | 57.50 | 701,235 | 547,873 | 41,646 | 122,581 |
| Pittsburg & Shawmut | Nov. | 102 | 101,989 | 3,946 | 110,469 | 22,382 | 41,130 | 1,229 | 43,393 | 6,695 | 114,829 | 103.90 | —4,360 | —9,473 | 29,688 | 36,957 |
| | 11 mos. | 102 | 865,755 | 52,202 | 945,947 | 274,953 | 379,288 | 17,981 | 343,089 | 735,558 | 1,088,869 | 115.10 | —142,922 | —157,006 | 47,602 | 216,066 |
| Pittsburg & West Virginia | Nov. | 85 | 216,038 | 8,364 | 253,557 | 36,579 | 44,753 | 3,003 | 85,334 | 17,785 | 197,876 | 78.00 | 55,681 | 15,176 | 86,204 | —142,477 |
| | 11 mos. | 85 | 2,132,160 | 96,250 | 2,553,136 | 368,406 | 643,444 | 39,172 | 682,472 | 165,421 | 2,003,612 | 78.50 | 549,524 | 228,551 | 717,833 | —716,438 |
| Pittsburg, Shawmut & Northern | Nov. | 210 | 136,884 | 5,763 | 145,634 | 24,693 | 49,475 | 1,282 | 60,014 | 6,451 | 141,016 | 97.40 | 3,718 | 1,424 | 23,666 | —9,085 |
| | 11 mos. | 210 | 1,014,012 | 68,507 | 1,122,560 | 234,734 | 475,840 | 18,243 | 487,866 | 72,438 | 1,289,173 | 114.80 | —166,613 | —192,688 | —148,819 | —169,251 |
| Quincy, Omaha & Kansas City | Nov. | 252 | 117,559 | 25,691 | 151,908 | 36,356 | 23,420 | 851 | 74,272 | 2,000 | 136,497 | 89.90 | 15,411 | 11,487 | 2,119 | 43,155 |
| | 11 mos. | 252 | 763,462 | 261,730 | 1,127,335 | 331,438 | 188,679 | 9,037 | 560,784 | 24,402 | 1,111,931 | 98.60 | 15,404 | —27,825 | —93,797 | —154,718 |
| Richmond, Fred. & Potomac | Nov. | 117 | 420,077 | 274,277 | 858,039 | 91,736 | 112,624 | 6,863 | 357,097 | 29,170 | 611,887 | 71.31 | 246,152 | 208,005 | 169,328 | 112,123 |
| | 11 mos. | 117 | 5,058,288 | 3,200,727 | 9,908,382 | 1,167,943 | 1,355,365 | 87,224 | 3,495,131 | 303,366 | 6,605,937 | 66.67 | 3,302,445 | 2,757,613 | 2,273,658 | 1,143,997 |
| Rutland | Nov. | 415 | 326,884 | 97,025 | 512,920 | 85,113 | 105,803 | 7,757 | 221,210 | 12,696 | 434,122 | 84.60 | 78,798 | 53,858 | 69,967 | 44,612 |
| | 11 mos. | 415 | 2,888,301 | 1,352,336 | 5,302,893 | 1,025,376 | 1,016,240 | 90,815 | 2,359,146 | 144,489 | 4,653,119 | 87.70 | 649,774 | 409,304 | 476,008 | 392,641 |
| St. Louis-San Francisco | Nov. | 4,760 | 4,774,136 | 1,555,682 | 6,848,264 | 821,230 | 1,204,431 | 83,641 | 2,588,334 | 188,704 | 485,783 | 70.90 | 1,991,481 | 1,712,634 | 1,508,448 | 1,377,096 |
| | 11 mos. | 4,760 | 50,120,759 | 16,646,548 | 72,169,161 | 10,498,829 | 13,504,754 | 915,594 | 27,094,798 | 2,069,900 | 53,800,311 | 74.60 | 18,368,850 | 14,904,707 | 13,978,938 | 16,726,394 |
| Ft. Worth & Rio Grande | Nov. | 235 | 102,682 | 25,928 | 139,083 | 25,628 | 31,211 | 2,731 | 63,918 | 6,049 | 128,965 | 92.70 | 10,118 | 6,591 | —4,827 | 14,394 |
| | 11 mos. | 235 | 828,496 | 318,115 | 1,263,427 | 426,553 | 276,136 | 29,986 | 584,484 | 64,042 | 1,376,698 | 109.00 | —113,271 | —154,023 | —242,798 | —190,348 |
| St. Louis, San Fran. & Tex | Nov. | 134 | 122,764 | 14,319 | 144,718 | 28,630 | 23,385 | 3,722 | 58,601 | 7,378 | 121,715 | 84.10 | 23,003 | 21,124 | —4,518 | —19,699 |
| | 11 mos. | 134 | 1,315,661 | 165,380 | 1,551,603 | 321,225 | 253,684 | 40,505 | 632,330 | 75,811 | 1,322,642 | 85.20 | 228,961 | 207,368 | —40,112 | —284,902 |
| St. Louis-Southwestern | Nov. | 968 | 1,630,544 | 154,984 | 1,850,983 | 177,753 | 360,883 | 40,280 | 499,120 | 53,200 | 1,135,481 | 61.30 | 715,502 | 630,669 | 555,290 | 725,467 |
| | 11 mos. | 968 | 14,519,232 | 1,411,450 | 16,565,184 | 2,165,065 | 2,486,072 | 458,027 | 4,557,226 | 581,524 | 10,302,327 | 62.20 | 6,262,857 | 5,440,687 | 4,941,161 | 4,962,344 |
| St. Louis-Southwestern of Tex | Nov. | 807 | 578,800 | 100,607 | 727,229 | 101,797 | 250,597 | 19,753 | 409,655 | 30,399 | 808,814 | 111.20 | —81,585 | —105,601 | —115,144 | —14,919 |
| | 11 mos. | 807 | 5,466,956 | 975,428 | 6,882,975 | 1,805,476 | 1,802,374 | 218,831 | 3,572,232 | 342,052 | 7,727,883 | 112.30 | —844,908 | —1,109,953 | —1,064,298 | —865,844 |
| San Antonio & Aransas Pass | Nov. | 739 | 394,346 | 72,786 | 514,408 | 78,981 | 121,330 | 8,518 | 192,157 | 21,484 | 421,539 | 81.90 | 92,869 | 72,161 | 80,503 | 67,916 |
| | 11 mos. | 739 | 4,140,895 | 804,635 | 5,307,190 | 983,593 | 1,215,047 | 104,812 | 2,197,083 | 281,259 | 4,774,723 | 90.00 | 532,467 | 371,938 | 279,578 | 183,784 |
| San Antonio, Uvalde & Gulf | Nov. | 317 | 49,895 | 15,944 | 73,384 | 17,210 | 13,284 | 2,940 | 35,834 | 8,596 | 77,824 | 106.10 | —4,440 | —8,647 | —19,750 | —25,850 |
| | 11 mos. | 317 | 674,043 | 192,960 | 962,670 | 168,414 | 129,287 | 31,253 | 373,493 | 77,021 | 778,129 | 80.80 | 184,541 | 149,543 | 26,526 | 62,645 |
| Seaboard Air Line | Nov. | 3,563 | 3,066,120 | 742,091 | 4,223,461 | 596,881 | 892,197 | 127,844 | 1,518,374 | 168,454 | 3,328,691 | 78.80 | 894,770 | 720,428 | 491,878 | 434,434 |
| | 11 mos. | 3,563 | 28,925,501 | 7,898,353 | 41,161,595 | 4,791,239 | 7,515,998 | 1,342,985 | 16,963,398 | 1,748,233 | 32,682,317 | 79.40 | 8,479,278 | 6,570,093 | 3,716,977 | 1,785,617 |
| Southern | Nov. | 6,971 | 8,786,056 | 2,442,848 | 12,176,616 | 1,588,957 | 2,016,224 | 204,156 | 4,574,603 | 309,372 | 8,769,335 | 72.00 | 3,407,281 | 2,871,652 | 2,466,601 | 2,366,608 |
| | 11 mos. | 6,971 | 79,991,458 | 27,144,261 | 116,265,555 | 16,100,345 | 19,734,209 | 2,266,479 | 45,999,622 | 3,447,655 | 88,418,450 | 76.00 | 27,847,105 | 22,509,114 | 17,980,555 | 12,165,835 |
| Alabama Gr Southern | Nov. | 318 | 656,382 | 148,365 | 850,618 | 100,646 | 158,396 | 18,181 | 270,802 | 23,418 | 576,949 | 67.80 | 273,669 | 240,200 | 235,764 | 62,689 |
| | 11 mos. | 318 | 5,549,440 | 1,655,801 | 7,657,593 | 960,390 | 1,552,317 | 196,876 | 2,971,171 | 264,462 | 6,007,006 | 78.40 | 1,650,587 | 1,204,670 | 1,188,597 | 717,394 |
| Cin., New Orleans & Tex. Pac | Nov. | 338 | 1,346,348 | 280,598 | 1,701,654 | 195,602 | 420,282 | 30,133 | 576,347 | 41,297 | 1,271,731 | 74.70 | 429,923 | 379,424 | 246,463 | 101,164 |
| | 11 mos. | 338 | 11,347,890 | 2,954,957 | 15,067,631 | 1,835,321 | 3,918,793 | 311,921 | 5,556,113 | 455,882 | 12,178,338 | 80.80 | 2,889,293 | 2,146,985 | 1,469,610 | 1,709,953 |
| Georgia, Southern & Fla | Nov. | 402 | 238,907 | 111,438 | 384,280 | 68,214 | 80,010 | 8,783 | 155,828 | 11,933 | 327,735 | 85.30 | 56,545 | 35,834 | 39,209 | —32,020 |
| | 11 mos. | 402 | 2,691,506 | 1,097,398 | 4,114,956 | 689,648 | 724,259 | 95,550 | 1,789,235 | 134,372 | 3,463,352 | 84.20 | 651,604 | 447,650 | 297,562 | —619,717 |
| New Orleans & Northeastern | Nov. | 207 | 434,069 | 66,524 | 561,873 | 82,895 | 110,997 | 13,194 | 227,277 | 16,038 | 453,491 | 80.70 | 108,382 | 77,001 | 64,402 | —65,267 |
| | 11 mos. | 207 | 3,504,709 | 849,719 | 4,923,326 | 766,328 | 1,147,298 | 117,727 | 2,312,578 | 183,221 | 4,566,638 | 92.80 | 356,688 | —49,088 | —91,916 | —300,579 |
| Northern Alabama | Nov. | 110 | 130,135 | 12,147 | 145,091 | 20,055 | 6,818 | 1,113 | 51,041 | 2,793 | 81,820 | 56.40 | 63,271 | 59,287 | 29,588 | 3,290 |
| | 11 mos. | 110 | 1,127,874 | 128,586 | 1,286,398 | 196,633 | 68,058 | 13,883 | 502,584 | 32,289 | 813,445 | 63.20 | 472,953 | 428,672 | 151,433 | —43,402 |
| Southern Pacific | Nov. | 7,116 | 11,258,610 | 3,447,995 | 16,617,029 | 2,088,316 | 2,930,052 | 262,884 | 4,886,768 | 448,054 | 10,895,103 | 65.60 | 5,721,926 | 4,219,394 | 4,425,355 | 2,021,921 |
| | 11 mos. | 7,118 | 110,919,067 | 40,569,395 | 167,895,320 | 21,820,917 | 28,885,576 | 2,640,182 | 55,526,725 | 4,817,641 | 116,703,985 | 69.50 | 51,191,335 | 37,320,099 | 36,238,879 | 33,471,700 |
| Arizona Eastern | Nov. | 382 | 238,400 | 29,167 | 285,416 | 27,546 | 29,399 | 3,164 | 67,401 | 16,942 | 145,623 | 51.00 | 139,793 | 115,363 | 101,317 | —2,046 |
| | 11 mos. | 382 | 2,444,762 | 310,104 | 2,878,000 | 368,859 | 336,267 | 34,739 | 815,213 | 200,939 | 1,765,991 | 61.40 | 1,112,009 | 844,716 | 685,803 | —5,153 |
| Atlantic S. S. Lines | Nov. | ... | 1,038,163 | 47,615 | 1,149,671 | 14,135 | 303,920 | 17,867 | 647,888 | 26,033 | 1,009,843 | 87.80 | 139,828 | 128,359 | 128,359 | 98,370 |
| | 11 mos. | ... | 9,769,685 | 578,727 | 10,908,189 | 146,551 | 2,278,477 | 215,413 | 6,277,517 | 300,107 | 9,218,065 | 84.50 | 1,690,124 | 1,555,619 | 1,557,979 | 347,111 |

## REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER AND ELEVEN MONTHS OF CALENDAR YEAR 1922—CONTINUED

| Name of road. | | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Operating ratio. | Net from railway operation. | Operating income (or loss). | Net after rentals. | Net after rentals 1921. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Freight. | Passenger. | Total (inc. misc.) | Maintenance of Way and structures. | Maintenance of Equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| Galv., Harris. & San Ant. | Nov. | 1,379 | $1,493,964 | $366,389 | $1,989,897 | $312,182 | $488,308 | $38,862 | $884,961 | $74,284 | $1,767,038 | 88.80 | $222,859 | $123,860 | —$119,673 | $158,434 |
| | 11 mos. | 1,379 | 14,869,421 | 4,111,424 | 20,117,305 | 3,643,984 | 4,059,271 | 410,479 | 8,018,688 | 797,335 | 16,976,061 | 84.40 | 3,141,244 | 2,501,636 | 1,802,778 | 2,032,933 |
| Houston & Texas Central | Nov. | 932 | 1,064,844 | 290,101 | 1,451,496 | 309,450 | 277,252 | 22,704 | 522,319 | 43,343 | 1,175,268 | 81.00 | 276,228 | 207,653 | 138,753 | 294,307 |
| | 11 mos. | 932 | 9,617,822 | 3,206,082 | 13,687,440 | 2,550,018 | 2,605,212 | 261,539 | 4,690,304 | 468,889 | 10,556,225 | 77.10 | 3,131,215 | 2,612,847 | 2,179,034. | 1,452,650 |
| Houston, East & W. Texas | Nov. | 191 | 228,705 | 43,081 | 287,654 | 38,742 | 68,277 | 3,359 | 109,572 | 8,259 | 223,490 | 77.70 | 64,164 | 51,159 | 26,536 | 17,889 |
| | 11 mos. | 191 | 2,284,730 | 460,295 | 2,882,201 | 543,299 | 596,625 | 38,249 | 1,122,098 | 89,169 | 2,366,251 | 82.10 | 515,950 | 436,580 | 252,791 | 230,648 |
| Louisiana Western | Nov. | 207 | 303,444 | 80,855 | 413,942 | 13,869 | 120,255 | 9,879 | 105,622 | 16,867 | 270,146 | 65.30 | 143,796 | 118,271 | 105,435 | 4,431 |
| | 11 mos. | 207 | 2,649,178 | 943,669 | 3,861,511 | 615,194 | 803,737 | 94,229 | 1,116,537 | 191,677 | 2,865,220 | 58.30 | 996,291 | 718,600 | 717,845 | 639,578 |
| Morgan's L. & Tex. R. R. & S. S. | Nov. | 400 | 734,549 | 139,131 | 934,477 | 158,733 | 250,336 | 16,876 | 332,281 | 31,413 | 795,044 | 85.10 | 139,433 | 84,207 | 37,920 | 10,313 |
| | 11 mos. | 400 | 5,287,574 | 1,646,153 | 7,511,244 | 1,550,942 | 1,829,130 | 169,215 | 2,955,163 | 360,768 | 6,917,354 | 92.10 | 593,890 | 72,565 | —120,083 | —363,431 |
| Texas & New Orleans | Nov. | 507 | 581,014 | 144,026 | 790,135 | 223,631 | 108,019 | 17,188 | 330,143 | 25,681 | 709,688 | 89.80 | 80,447 | 28,329 | 2,210 | 17,445 |
| | 11 mos. | 507 | 5,793,563 | 1,667,972 | 7,961,837 | 1,744,096 | 1,895,700 | 125,407 | 3,079,165 | 280,949 | 7,182,755 | 90.20 | 779,082 | 483,735 | 116,721 | —297,860 |
| Spokane International | Nov. | 165 | 109,033 | 23,335 | 138,269 | 15,113 | 9,979 | 3,094 | 39,703 | 6,917 | 75,248 | 54.40 | 63,021 | 56,057 | 49,677 | 21,737 |
| | 11 mos. | 165 | 903,709 | 158,962 | 1,118,763 | 163,661 | 96,586 | 34,244 | 381,290 | 65,957 | 749,334 | 67.00 | 369,429 | 307,454 | 233,188 | 172,932 |
| Spokane, Portland & Seattle | Nov. | 551 | 486,736 | 130,414 | 680,589 | 71,813 | 99,092 | 9,729 | 199,934 | 20,080 | 409,008 | 60.10 | 271,581 | 231,520 | 213,484 | 154,706 |
| | 11 mos. | 551 | 4,466,943 | 1,562,905 | 6,666,178 | 646,193 | 996,928 | 111,059 | 2,203,407 | 222,101 | 4,274,747 | 64.10 | 2,391,431 | 1,557,545 | 1,440,230 | 1,445,783 |
| Tennessee Central | Nov. | 292 | 178,025 | 37,136 | 228,410 | 36,755 | 46,182 | 5,679 | 102,081 | 9,400 | 199,855 | 87.50 | 28,555 | 23,402 | —10,004 | ..... |
| | 11 mos. | 292 | 1,574,918 | 402,055 | 2,106,282 | 338,615 | 315,932 | 57,561 | 912,307 | 85,096 | 1,708,990 | 81.10 | 397,292 | 351,806 | 95,478 | ..... |
| Terminal R. R. Assn. of St. Louis | Nov. | 37 | ..... | ..... | 388.558 | —12,142 | 53,084 | 1,035 | 202,886 | —21,536 | 227,883 | 58.60 | 160,675 | 93,015 | 242,660 | 199,825 |
| | 11 mos. | 37 | ..... | ..... | 4,112,083 | 800,874 | 466,605 | 11,584 | 1,451,570 | 57,025 | 2,826,681 | 68.70 | 1,285,402 | 655,220 | 1,937,540 | 1,803,058 |
| East St. Louis Connecting | Nov. | 1 | ..... | ..... | 195,878 | 4,780 | 25,222 | 293 | 63,211 | 3,260 | 96,766 | 49.40 | 99,112 | 91,041 | 81,782 | 28,387 |
| | 11 mos. | 1 | ..... | ..... | 1,893,854 | 138,124 | 100,053 | 3,342 | 628,359 | 29,031 | 898,909 | 47.50 | 994,945 | 882,012 | 785,393 | 323,059 |
| St. Louis, Mchts. Br. Term. | Nov. | 9 | ..... | ..... | 443,630 | 84,090 | 26,548 | 912 | 305,357 | 5,819 | 422,726 | 95.30 | 20,904 | —25,289 | —25,686 | 90,062 |
| | 11 mos. | 9 | ..... | ..... | 3,688,366 | 497,201 | 308,392 | 10,276 | 1,687,889 | 53,301 | 2,557,059 | 69.30 | 1,131,307 | 882,246 | 1,008,008 | 684,463 |
| St. Louis Transfer | Nov. | 6 | ..... | ..... | 68,420 | Cr. 4,274 | 10,521 | 169 | 34,337 | 1,580 | 42,333 | 61.90 | 26,087 | 25,198 | 21,658 | 22,074 |
| | 11 mos. | 6 | ..... | ..... | 683,108 | 98,850 | 56,075 | 1,930 | 364,765 | 17,895 | 539,515 | 79.00 | 143,593 | 136,573 | 51,233 | 408,750 |
| Texas & Pacific | Nov. | 1,952 | 2,255,068 | 608,847 | 3,069,582 | 402,646 | 680,332 | 52,033 | 1,179,383 | 212,420 | 2,549,101 | 83.00 | 520,481 | 439,371 | 293,991 | 699,385 |
| | 11 mos. | 1,952 | 19,413,891 | 6,557,349 | 28,113,744 | 4,678,922 | 5,872,990 | 538,078 | 10,674,245 | 1,129,893 | 23,111,919 | 82.20 | 5,001,825 | 38,425,542 | 2,979,592 | 3,905,727 |
| Toledo, Peoria & Western | Nov. | 247 | 125,774 | 42,811 | 185,047 | 43,459 | 45,372 | 2,460 | 80,077 | 7,702 | 179,070 | 96.80 | 5,977 | —5,050 | 4,708 | —25,825 |
| | 11 mos. | 247 | 963,270 | 461,665 | 1,562,044 | 311,349 | 361,658 | 29,958 | 792,066 | 84,845 | 1,579,788 | 101.10 | —17,744 | —139,251 | —153,833 | —356,041 |
| Toledo, St. Louis & Western | Nov. | 454 | 1,103,637 | 27,049 | 1,178,151 | 196,272 | 132,854 | 19,998 | 356,950 | 223,110 | 929,111 | 78.90 | 249,040 | 187,174 | 114,766 | 239,090 |
| | 11 mos. | 454 | 9,627,781 | 324,356 | 10,410,124 | 1,337,055 | 1,488,172 | 234,164 | 3,212,233 | 853,603 | 7,125,012 | 68.40 | 3,285,112 | 2,677,646 | 2,230,964 | 1,384,145 |
| Trinity & Brazos Valley | Nov. | 368 | 187,395 | 20,862 | 215,658 | 32,486 | 43,824 | 2,962 | 78,386 | Cr. 8,357 | 149,199 | 69.20 | 66,459 | 59,254 | 31,981 | 145,143 |
| | 11 mos. | 368 | 2,239,985 | 232,595 | 2,567,808 | 567,925 | 473,783 | 35,711 | 923,513 | 125,945 | 2,121,454 | 42.60 | 446,354 | 368,683 | —31,942 | 284,340 |
| Ulster & Delaware | Nov. | 128 | 80,823 | 12,753 | 121,917 | 22,012 | 19,783 | 1,708 | 78,367 | 10,309 | 132,458 | 108.60 | —10,541 | —16,582 | —21,708 | —18,390 |
| | 11 mos. | 128 | 697,428 | 464,934 | 1,536,152 | 257,395 | 252,395 | 33,493 | 799,870 | 91,793 | 1,439,784 | 93.70 | 96,368 | 30,267 | —13,186 | 51,178 |
| Union | Nov. | 45 | ..... | ..... | 981,665 | 63,282 | 163,981 | 214 | 499,228 | 6,951 | 733,656 | 74.70 | 248,009 | 254,009 | 338,116 | 257,196 |
| | 11 mos. | 45 | ..... | ..... | 10,339,652 | 797,044 | 1,927,669 | 2,532 | 4,393,582 | 77,000 | 7,197,827 | 69.60 | 3,141,825 | 3,047,080 | 3,868,487 | 2,209,899 |
| Union Pacific | Nov. | 3,707 | 8,400,817 | 1,347,905 | 10,634,353 | 758,560 | 2,141,968 | 141,608 | 3,261,763 | 283,098 | 6,761,333 | 63.60 | 3,873,020 | 3,285,325 | 3,175,027 | 1,779,167 |
| | 11 mos. | 3,692 | 73,711,317 | 15,910,666 | 98,335,449 | 11,474,961 | 20,364,460 | 1,485,118 | 28,790,078 | 3,300,836 | 67,347,886 | 68.50 | 30,987,563 | 24,591,100 | 24,037,705 | 26,428,795 |
| Oregon Short Line | Nov. | 2,366 | 2,932,510 | 423,132 | 3,618,886 | 336,995 | 567,722 | 37,775 | 1,154,991 | 113,811 | 2,270,788 | 62.70 | 1,348,098 | 1,098,754 | 1,068,343 | 626,312 |
| | 11 mos. | 2,361 | 25,957,712 | 5,061,094 | 33,456,479 | 4,919,674 | 6,103,796 | 481,139 | 11,117,754 | 1,265,469 | 24,547,885 | 73.40 | 8,908,594 | 5,928,872 | 5,661,884 | 4,993,303 |
| Oreg.-Wash. R. R. & Nev. | Nov. | 2,237 | 1,756,078 | 449,323 | 2,442,394 | 507,511 | 385,649 | 55,953 | 1,074,241 | 128,475 | 2,183,140 | 89.40 | 259,254 | 77,995 | —14,667 | 160,747 |
| | 11 mos. | 2,230 | 18,291,569 | 5,227,229 | 25,845,127 | 5,686,657 | 4,745,361 | 651,064 | 11,400,300 | 1,371,269 | 24,186,469 | 93.60 | 1,658,658 | —334,645 | —1,247,438 | —73,531 |
| St. Joseph & Grand Island | Nov. | 258 | 259,808 | 26,446 | 305,217 | 66,784 | 54,296 | 2,677 | 123,689 | 11,526 | 262,805 | 85.80 | 43,412 | 27,221 | 19,931 | —10,200 |
| | 11 mos. | 258 | 2,429,049 | 281,325 | 2,900,458 | 549,882 | 564,792 | 28,326 | 1,271,195 | 130,856 | 2,548,884 | 87.90 | 351,574 | 166 458 | 69,025 | 132,018 |
| Utah | Nov. | 102 | 180,608 | 723 | 182,478 | 32,271 | 46,138 | 339 | 57,463 | 5,374 | 141,585 | 77.60 | 40,893 | 35,390 | 29,791 | 21,329 |
| | 11 mos. | 102 | 1,564,450 | 8,189 | 1,587,113 | 275,722 | 408,940 | 4,041 | 414,704 | 53,990 | 1,156,865 | 72.90 | 430,248 | 361,316 | 235,015 | 1,928 |
| Virginia | Nov. | 540 | 1,295,348 | 65,251 | 1,452,988 | 172,659 | 465,995 | 11,489 | 494,269 | 36,478 | 1,172,560 | 80.70 | 280,428 | 129,219 | 211,821 | 293,860 |
| | 11 mos. | 530 | 15,650,740 | 745,241 | 17,519,971 | 2,000,586 | 4,373,696 | 128,661 | 4,437,404 | 348,937 | 11,265,040 | 64.30 | 6,254,931 | 4,870,246 | 5,126,355 | 4,660,890 |
| Wabash | Nov. | 2,472 | 3,878,087 | 701,459 | 5,085,572 | 709,087 | 1,470,359 | 123,255 | 1,939,295 | 140,527 | 4,402,096 | 86.60 | 683,476 | 494,278 | 168,278 | 435,922 |
| | 11 mos. | 2,472 | 40,369,478 | 8,273,769 | 52,827,450 | 7,729,050 | 11,171,237 | 1,266,564 | 22,109,216 | 1,626,781 | 44,127,301 | 83.50 | 8,700,149 | 6,602,739 | 3,651,182 | 3,995,828 |
| Western Maryland | Nov. | 804 | 1,734,695 | 69,750 | 1,912,747 | 337,914 | 481,136 | 36,592 | 668,050 | 43,635 | 1,588,713 | 83.10 | 324,034 | 264,034 | 274,243 | 299,837 |
| | 11 mos. | 804 | 14,776,847 | 890,971 | 16,769,873 | 2,400,994 | 3,676,671 | 385,808 | 6,013,032 | 501,524 | 13,216,149 | 78.80 | 3,553,724 | 3,003,724 | 2,815,094 | 2,777,897 |
| Western Pacific | Nov. | 1,045 | 972,159 | 118,860 | 1,173,519 | 158,451 | 208,019 | 34,279 | 414,372 | 34,006 | 863,811 | 73.60 | 309,708 | 239,866 | 280,809 | 66,952 |
| | 11 mos. | 1,044 | 8,630.051 | 2,036,417 | 11,472,537 | 1,863,122 | 2,011,489 | 362,961 | 4,169,291 | 403,712 | 9,037,373 | 78.80 | 2,435,164 | 1,541,576 | 1,738,981 | 1,316,898 |
| **Wheeling & Lake Erie** | **Nov.** | **511** | **962,939** | **44,176** | **1,108,303** | **134,850** | **439,283** | **14,770** | **447,933** | **35,333** | **1,073,142** | **96.80** | **35,161** | **—57,639** | **—87,717** | **180,388** |
| | **11 mos.** | **511** | **10,359,409** | **711,530** | **12,113,076** | **1,995,697** | **3,135,594** | **193,403** | **4,596,647** | **375,681** | **10,329,583** | **85.30** | **1,783,493** | **635,971** | **331,759** | **1,806,255** |

## Agreement With Erie Shopmen

The Erie Railroad has made an agreement with the committees of the shop crafts putting in permanent form the informal agreements which were entered into when the striking shopmen returned to work, on September 27, last. The eight-hour day is standard; eight hours' service for eight hours' pay; and the minimum rates are those prescribed in the schedule of the United States Railroad Labor Board, in which overtime work is allowed time-and-one-half. In the Erie agreement Sunday and holiday work is to be paid for at the same rates as for work done on other days.

About 200 men who have been working for less than the standard rates are to receive back pay, the agreement being retroactive to September 27.

Strikers who return to work are to retain their seniority rights *as between themselves.*

Grievances or controversies are to be settled by local committees so far as possible, with right of appeal, for final adjudication, to regional boards, one in each Erie Region, consisting of railroad officers and brotherhood representatives in equal number.

The total shop forces of the Erie system number about 9,000 men.

## Clark Equipment Company Gives Prize for Best Poem on the "Spirit of Transportation"

The Clark Equipment Company, Buchanan, Mich., has given a prize of $1,000 for a poem appropriate to the theme the "Spirit of Transportation." The contest was advertised and 750 manuscripts were received from authors throughout the country. The poem which won the prize was that contributed by Roy George, of Scottsdale, Ariz. Mr. George graduated from Columbia University in 1897.

Poems were considered with respect to popular reader's understanding and the value relative to the history of transportation. The principal idea expressed in the poems submitted was that of speed.

The following men served as a board of judges to pass upon the merits of the poems submitted: William Stanley Braithwaite, editor, Anthology of Magazine Verse; Harold L. Brown, editor, Bus Transportation; Samuel O. Dunn, editor, *Railway Age;* Glenn Frank, editor, Century Magazine; Frank W. Roche, publisher, Automobile Topics, and Merle Thorpe, editor, The Nation's Business.

The poem contest supplements the previous contest of the Clark Equipment Company in which 12 leading artists were commissioned to express, uninstructed, the general theme the "Spirit of Transportation." Each artist was paid for his work and the paintings competed for a bonus prize of $1,000.

## Court Refuses Railroad's Plea for Protection Against Acid Water

In the Court of Common Pleas of Fayette County, Pennsylvania, the application of the Pennsylvania Railroad and the Mountain Water Supply Company and the Dunbar Water Supply Company, its subsidiaries, for an injunction prohibiting 29 individual, partnership and corporation coal owners from draining water discharged from their mines into Indian Creek has been dismissed. Properties estimated to be worth more than $25,000,000 are involved in the case which, it is expected, will now go to the United States Supreme Court for final decision.

The State Court, says the Philadelphia Public Ledger, holds that the railroad and its water companies, should the injunction be granted and sustained, would put the defendant coal owners out of business; that the cost to the defendant companies of providing artificial drainage would be prohibitive, while the cost of chemically treating the water by the railroad and water companies is practicable and not exorbitant in view of the advantages derived from the use of the water.

The railroad and water companies, plaintiffs, have erected a central impounding reservoir of 251,000,000 gallons capacity. The water system facilities of the plaintiffs consists of sixteen storage reservoirs and standpipes with a total capacity of 318,335,400 gallons, 142 miles of pipe lines of a diameter of 36 in. and less, one line leading from the Indian Creek reservoir to Pittsburgh by way of Connellsville, Scottdale and Greensburg and another from the reservoir to Pittsburgh by way of Uniontown, Brownsville and Monongahela City, all the water for which system is taken from Indian Creek for domestic and industrial use.

The Indian Creek watershed is 22 miles long and nine miles wide. Underlying the land constituting the watershed in Fayette County are 43,000 acres of coal, the value of which together with the investments made for its operation, is several millions of dollars.

The court, in its decree, points out that the water flows from the mines by gravity and through crevices or breaks in the rock is discharged into Indian Creek. From its contact with the sulphur in the coal measure and oxygen in the air the water is highly charged with sulphuric acid, and when used for steam making in locomotive or stationary boilers quickly destroys the boiler tubes and any metal with which it comes in contact.

## Santa Fe's Public Relations Campaign

President W. B. Storey, of the Atchison, Topeka & Santa Fe, has inaugurated a campaign to inform the public in the country traversed by the company of the facts about the railroad situation in general and the Santa Fe in particular. In a series of signed statements appearing in the daily newspapers in the territory served by the Santa Fe, he is refuting the charges of inefficiency and profiteering that have been made against the railroad managements and presenting the facts as they exist. Mr. Storey plans through this campaign to counteract the influence of the incorrect and misleading propaganda that has been circulated throughout the country, particularly among the farmers, and to form in its stead a public sentiment favorable to the railroads and appreciative of their efforts to provide efficient transportation. This is the first step to promote more cordial public relations, and the wide and favorable editorial attention that it has attracted proves its success.

Mr. Storey has given particular attention to the charges of Senator Capper of Kansas, who has repeatedly condemned the operation of the Santa Fe and other railroads in his newspapers and in speeches in the Senate. In an open letter to Mr. Capper, he refuted arguments by the senator for lower freight rates, demonstrating that Mr. Capper's figures on the earnings, operating costs and surplus of the Santa Fe were widely at variance with the facts. He reiterated his declaration that the Santa Fe was doing everything possible to ease the burden of the farmers and pointed out that ruining the railroads would be mutually disastrous. Mr. Storey wrote in part as follows:

"You say that this year the Santa Fe is earning about 25 per cent on its preferred stock and 13 per cent on its common. The actual figures are as follows: Our earnings for the first ten months have been $29,357,141, which gives us our ten months' proportion of (1) bond interest, (2) the 5 per cent for preferred stock, and (3) the 6 per cent for common, with $2,604,705 for surplus, which is 1.1 per cent on the common stock.

"You speak of the enormous business being done by the railways and suggest that they should divide their prosperity with the farmer. I want to point out that heavy business does not mean heavy earnings. In the first nine months of this year (1922) the railroads, as a whole, only earned at the rate of 3.7 per cent for the year, and if earnings keep up for the next three months as they are running at present they may reach 4 per cent. Is this prosperity, as you call it? I can say definitely that if 4 per cent is all that can be earned in a year of heavy business like this, the railroads will necessarily have to postpone still further the day when they can furnish adequate facilities to move the farm products of this country."

The first statement which appeared as an advertisement signed by Mr. Storey, dealt with the car shortage situation on the Santa Fe. As evidence that the road was doing all possible to relieve the situation, it pointed out the $9,000,000 box car buying program which the Santa Fe completed in 1922. As in subsequent articles, Mr. Storey urged that those who used the railroad be open-minded in regard to their problems and ready to co-operate with the carriers whenever possible. The statement read in part:

"From January to September, inclusive, the Santa Fe handled 58,117 cars of Kansas grain and grain products. This was only one-fifth less than in 1921, when cars were plentiful and other business in the United States was at a minimum, and it was nearly 23,000 cars more than in the year 1920, and 21,000 more than in 1919.

"We ordered early in 1922, 2,000 additional box cars, and,

within a month, 2,000 other cars available for wheat loading, making a total of 4,000 cars. In addition we have ordered other equipment in the way of locomotives, stock, refrigerator and coal cars that will make our total bill $23,000,000 for this year alone."

The second statement pointed out the impossibility of reduced freight rates so long as the present government regulation of wages and profits continues to exist. The third and last statement denied the charge that the railroads are seeking returns on "watered stock." Mr. Storey presented data compiled by the Interstate Commerce Commission which shows the transportation systems have a value of $2,000,000,000 more than their net capitalization. He said in conclusion:

"But recently reference has been made to the 'valuation that the railroads have succeeded in putting over on the Interstate Commerce Commission.' The valuation work on the Santa Fe is nearly completed and we know that we have not 'put anything over' on the Interstate Commerce Commission. On the contrary, we believe that the Interstate Commerce Commission has been over-strict in its rules and methods of valuation, and that as a consequence it has greatly undervalued our railroad. When the work is completed, no water will be found in Santa Fe stock."

## National Railway Appliances Association Exhibit

A total of 162 firms have taken space and are arranging to participate in the exhibit of the National Railway Appliances Association in the Coliseum, Chicago, on March 12 to 15 inclusive. All available space has been allotted, although all members who have applied for space have been accommodated. The firms which have arranged to present exhibits are as follows:

NATIONAL RAILWAY APPLIANCES ASSOCIATION EXHIBITORS

Adams & Westlake Company, Chicago.
Adams Motor & Mfg. Company, Chicago.
Air Reduction Sales Company, New York.
American Abrasive Metals Company, Chicago.
American Car & Foundry Company, Chicago.
American Chain Company, Bridgeport, Conn.
American Hoist & Derrick Company, St. Paul, Minn.
American Kron Scale Company, New York.
American Malleable Castings Association, Cleveland, Ohio.
American Radiator Company, Buffalo, N. Y.
Armco Culvert & Flume Mfgrs.' Association, Middletown, Ohio.
American Steel & Wire Company, Chicago.
American Valve & Meter Company, Cincinnati, Ohio.
American Vulcanized Fibre Company, Pittsburgh, Pa.
Argyle Railway Supply Company, Chicago.
Baker, R. & L., Company, Cleveland, Ohio.
Benjamin Electric Mfg. Company, Chicago.
Bethlehem Steel Company, Bethlehem, Pa.
Blaw-Knox Company, Pittsburgh, Pa.
Boss Nut Company, Chicago.
Brach Mfg. Company, L. S., Newark, N. J.
Bronson & Co., E. B., Blue Island, Ill.
Bryant Zinc Company, Chicago.
Buda Company, Chicago.
Carbic Manufacturing Company, Duluth, Minn.
Carnegie Steel Company, Pittsburgh, Pa.
Carter Bloxonend Flooring Company, Chicago.
Central Electric Company, Chicago.
Challenge Company, Batavia, Ill.
Chicago Bridge & Iron Works, Chicago.
Chicago Flag & Decorating Company, Chicago.
Chicago Malleable Castings Company, Chicago.
Chicago Pneumatic Tool Company, New York.
Clark Car Company, Pittsburgh, Pa.
Cleveland Frog & Crossing Company, Cleveland, Ohio.
Cleveland Railway Supply Company, Cleveland, Ohio.
Conical Roller Cattle Guard Company, Nashville, Tenn.
Creepcheck Company, Hoboken, N. J.
Crerar, Adams & Co., Chicago.
Detroit Graphite Company, Chicago.
Diamond State Fibre Company, Bridgeport, Pa.
Paul Dickinson, Inc., Chicago.
Dilworth, Porter & Co., Pittsburgh, Pa.
Direct Sales Company, The, Chicago.
Doty Business Machine Company, Chicago.
Duff Mfg. Company, Pittsburgh, Pa.
Edison, Inc., Thos. A., Bloomfield, N. J.
Electric Storage Battery Company, Philadelphia, Pa.
Electric Tamper & Equipment Company, Chicago.
Elwell-Parker Electric Company, New York.
Engineering & Contracting, Chicago.
Eymon Crossing Company, Marion, Ohio.
Fairbanks, Morse & Co., Chicago.
Fairmont Gas Engine & Railway Motor Car Co., Fairmont, Minn.
Federal Electric Company, Chicago.
Federal Signal Company, Albany, N. Y.
General Automatic Scale Company, St. Louis, Mo.
General Electric Company, Schenectady, N. Y.
General Railway Signal Company, Rochester, N. Y.
Gosso Company, Chicago.
Graver Corporation, Chicago.
Gurley, W. & L. E., Troy, N. Y.
Hall Switch & Signal Company, Garwood, N. J.
Hayes Track Appliance Company, Richmond, Ind.
Hazard Mfg. Company, Chicago.
Headley Good Roads Company, Philadelphia, Pa.
Hobbs Storage Battery Corporation, San Francisco, Cal.
Hubbard & Co., Pittsburgh, Pa.
Illinois Steel Company, Chicago.
Illinois Zinc Company, Chicago.
Ingersoll-Rand Company, New York.
Inland Steel Company, Chicago.
International Signal Company, New York.
Johns-Manville, Inc., New York.
Jordan Company, O. F., East Chicago, Ind.
Kalamazoo Railway Supply Company, Kalamazoo, Mich.
Kaustine Company, Buffalo, N. Y.
Kelly-Derby Company, Inc., Chicago.
Kentucky Rock Asphalt Company, Louisville, Ky.
Kerite Insulated Wire & Cable Company, Inc., Chicago.
Keystone Grinder & Mfg. Company, Pittsburgh, Pa.
Kilbourne & Jacobs Mfg. Company, Columbus, Ohio.
Koehring Company, Milwaukee, Wis.
Lehon Company, Chicago.
Lorain Steel Company, Lorain, Ohio.
L. & R. Culvert Company, Chicago.
Lufkin Rule Company, Saginaw, Mich.
Lundie Engineering Corporation, New York.
MacRae's Blue Book, Chicago.
Magnetic Signal Company, Los Angeles, Cal.
Maintenance Equipment Company, Chicago.
Massey Concrete Products Corporation, Chicago.
McGraw-Hill Company, Inc., New York.
Mechanical Mfg. Company, Chicago.
Mercury Mfg. Company, Chicago.
Metal & Thermit Corporation, New York.
Midvale Steel & Ordnance Company, Philadelphia, Pa.
Miller Train Control Corporation, Danville, Ill.
Minwax Company, New York.
Morden Frog & Crossing Works, Chicago.
Mudge & Co., Chicago.
M-V All Weather Train Control Company, Inc., Newark, N. J.
M. W. Supply Company, Philadelphia, Pa.
National Boiler Washing Company, Chicago.
National Carbon Company, Cleveland, Ohio.
National Lead Company, New York.
National Lock Washer Company, Newark, N. J.
National Malleable Castings Company, Cleveland, Ohio.
Nichols & Bro., George P., Chicago.
Northwestern Motor Company, Eau Claire, Wis.
Ogle Construction Company, Chicago.
Okonite Company, The, Passaic, N. J.
Otto Gas Engine Works, The, Chicago.
Oxweld Railroad Service Company, Chicago.
Page Steel & Wire Company, Bridgeport, Conn.
Patterson Company, W. W., Pittsburgh, Pa.
P. & M. Company, Chicago.
Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
Pocket List of Railroad Officials, New York.
Portland Cement Association, Chicago.
Positive Rail Anchor Company, Marion, Ind.
Pyrene Mfg. Company, Chicago.
Q. & C. Company, New York.
Rail Joint Company, The, New York.
Railway Accessories Corporation, New York.
Railroad Supply Company, Chicago.
Railway Purchases & Stores, Chicago.
Railway Review, Chicago.
Ramapo-Ajax Corporation, Hillburn, N. Y.
Rawls Machine & Mfg. Company, Chicago.
Raymond Concrete Pile Company, New York.
Reade Mfg. Company, Jersey City, N. J.
Regan Safety Devices Company, Inc., New York.
Reliance Mfg. Company, Masillon, Ohio.
Richards-Wilcox Mfg. Company, Aurora, Ill.
Roberts Co., George J., Dayton, Ohio.
Roberts & Schaefer Company, Chicago.
Sellers Mfg. Company, Chicago.
Sherwin-Williams Company, Cleveland.
Signal Accessories Corporation, Utica, N. Y.
Simmons-Boardman Publishing Company, New York.
Snow Construction Company, T. W., Chicago.
Southern Signal Company, Inc., Louisville, Ky.
Templeton, Kenly & Co., Ltd., Chicago.
Thompson Bros. Company, Chicago.
Torchweld Equipment Company, Chicago.
Track Specialties Company, New York.
Train Control Appliance Company, El Paso, Tex.
Union Switch & Signal Company, Swissvale, Pa.
U. S. Wind Engine & Pump Company, Batavia, Ill.
Verona Tool Works, Pittsburgh, Pa.
Volkhardt Company, Inc., Stapleton, Staten Island, N. Y.
Wailes-Dove-Hermiston Corporation, Cleveland, Ohio.
Warren Tool & Forge Company, Warren, Ohio.
Waterbury Battery Company, The, New York.
West Disinfecting Company, New York.
Western Electric Company, New York.
Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa.
Wharton, Jr., Co., Inc., William, Easton, Pa.
Woolery Machine Company, Minneapolis, Minn.
Wright Mfg. Company, Lisbon, Ohio.
Wyoming Shovel Works, Wyoming, Pa.

ASSOCIATE (NON-EXHIBITING) MEMBERS

American Manganese Steel Company, Chicago Heights, Ill.
Barrett Company, New York.
Chicago Railway Signal & Supply Company, Chicago.
Chipman Chemical Engineering Company, New York.
Corning Glass Works, Corning, N. Y.
Dominion Paint Works, Ltd., Walkerville, Ont.
Edison Storage Battery Company, Orange, N. J.
Elliott Frog & Switch Company, East St. Louis, Ill.
Ferguson Company, H. K., Cleveland, Ohio.
Frog Switch & Mfg. Company, Carlisle, Pa.
Gould Storage Battery Company, New York.
Hunt & Company, Robert W., Chicago.
Lidgerwood Mfg. Company, Chicago.
Pettibone-Mulliken Company, Chicago.
Railroad Water & Coal Handling Company, Chicago.
Standard Asphalt & Refining Company, Chicago.
Standard Underground Cable Company, Pittsburgh, Pa.
Twin Dry Cell Battery Company, Cleveland, Ohio.
Whall Company, C. H., Boston, Mass.

# Equipment and Supplies

## Locomotives

THE ST. LOUIS SOUTHWESTERN is inquiring for 15 Consolidation type locomotives.

THE ILLINOIS CENTRAL is inquiring for 35 Mikado and 15 Mountain type locomotives.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 30 Mikado type and 10 Mountain type locomotives.

THE PENNSYLVANIA has authorized the placing of orders for 300 locomotives to be constructed and delivered during the present year. Of the total number, 125 will be constructed at the company's Altoona Works. They will consist of 42 heavy passenger locomotives, 40 medium weight passenger locomotives, and 43 switching locomotives. The remainder of the authorization covers 175 heavy freight engines. Arrangements for construction of 100 of these have been made with the Baldwin Locomotive Works. The allotment of the other 75 will be determined later. It is planned to have many of the 300 new engines delivered and ready for use by spring and all by next fall. They will be utilized in the replacement of other engines to be retired from service.

## Freight Cars

THE UNIVERSAL PORTLAND CEMENT COMPANY is inquiring for 300 box cars.

THE ILLINOIS CENTRAL is inquiring for 125 caboose cars and 500 automobile cars.

THE ILLINOIS CENTRAL is inquiring for 1,500 box cars and 2,000 composite gondola cars.

THE ELGIN, JOLIET & EASTERN is reported to be contemplating the purchase of 500 gondola cars.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE is inquiring for 300 steel underframes and steel superstructures for gondola cars.

THE ATLANTA & WEST POINT has ordered 150 hopper cars of 55 tons' capacity from the American Car & Foundry Company.

THE ULEN CONTRACTING CORPORATION, New York City, has ordered 35 flat cars of 33 tons' capacity from the Magor Car Corporation.

A. B. C. REFRIGERATOR TRANSIT COMPANY, New York City, is having 500 refrigerator cars built at the shops of the Merchants' Dispatch.

THE UNITED FRUIT COMPANY has ordered 100 flat cars of 20 tons' capacity from the Magor Car Corporation for use on the Truxillo Railroad, Honduras. A contract for 10 flat cars of 20 tons' capacity has been given to the Gregg Company, Ltd.

THE GREAT NORTHERN, reported in the *Railway Age* of December 30 as inquiring for 1,000 U. S. R. A. standard box cars, has ordered this equipment from the Pullman Company and has also ordered 500 automobile cars from the American Car & Foundry Company.

THE CHICAGO, ROCK ISLAND & PACIFIC, reported in the *Railway Age* of December 2 as inquiring for 250 ballast cars, 250 flat cars and 250 stock cars, will place orders this week for 500 automobile cars, 250 refrigerator cars and 250 flat cars. This company will accept bids on 500 box cars and 500 coal cars.

THE CANADIAN NATIONAL has ordered 1,000 box cars from the National Steel Car Corporation; 1,000 box cars and 100 ballast cars from the Canadian Car & Foundry Company; 500 box cars, 100 general service cars and 100 steel coal cars from the Eastern Car Company, and will also have 276 general service cars repaired at the shops of the Eastern Car Company.

THE CHICAGO & NORTH WESTERN, reported in the *Railway Age* of December 23 as inquiring for 3,000 single sheath box cars of 80,000-lb. capacity and 200 steel underframe milk cars, has divided the box car order equally between the General American Car Company, the American Car & Foundry Company and the Western Steel Car Company, and has placed the order for the milk cars with the Pullman Company.

## Passenger Cars

THE BALTIMORE & OHIO is inquiring for four dining cars.

THE MOBILE & OHIO has ordered two coaches from the Pullman Company.

THE BANGOR & AROOSTOOK is inquiring for four steel underframe baggage cars.

THE CENTRAL OF GEORGIA is inquiring for two baggage and express cars, two coaches and two partition coaches.

THE NEW YORK CENTRAL is having 60 milk cars built at the shops of the Merchants Dispatch and is having a dynamometer car built in its West Albany shops.

THE CANADIAN NATIONAL has ordered 50 express refrigerator cars and 10 baggage cars from the National Steel Car Corporation; 10 mail and express cars, 35 coaches, 20 sleeping cars and 20 baggage cars from the Canadian Car & Foundry Company. The order for sleeping cars may be increased from 20 to 30.

## Machinery and Tools

THE HUDSON SHIPBUILDING & DRY DOCK COMPANY, Newburgh, N. Y., has ordered a complete flue shop from Joseph T. Ryerson & Son, also a 60-in. lathe and a 24-in. lathe from the same company.

THE DELAWARE, LACKAWANNA & WESTERN, reported in the *Railway Age* of December 23 as expecting to buy about 27 machine tools, has placed orders for tools as follows: A 54-in. Chambersburg 500-ton, single end car wheel press; one Winton 6-in. and one Winton 4-in. double spindle centering machine; two 14-in. Allen double spindle sensitive drilling machines; one Chicago steel power bending brake; two 42-in. vertical drilling machines; one 72-in. Bement duplex control, motor driven boring and milling machine; one Niles-Bement-Pond rapid production standard 48-in. planer; two Ryerson-Conradson 5-ft., high power, plain radial drills; two Ryerson-Conradson 30-in. selective geared engine lathes; two Ryerson-Conradson 17-in. selective geared hand portable engine lathes; seven 21-in. Ryerson-Conradson selective geared head engine lathes; one McCabe pneumatic flanging machine; one 36-in. Morton new type, heavy duty draw cut railroad shaper; one Buffalo universal No. 25 slitting shear, punch and bar cutter; one Brown & Sharpe No. 5B heavy plain milling machine; four Gould & Eberhard universal type crank shapers; one Warner & Swazey No. 2A universal hollow hexagon turret lathe.

## Signaling

THE GREAT NORTHERN has ordered from the General Railway Signal Company the material for automatic block signals on 348 miles of road; Fort Wright, Wash., to Wenatchee, 172 miles and Delano, Minn., to Breckenridge, 176 miles. These signals are to be color-light, three-indication, not semaphore, as stated in the *Railway Age* of January 6. All but 57 miles of this mileage is single track, on which the "A. P. B." system will be used. A total of 637 signals will be required.

THE NORTHERN PACIFIC has awarded a contract to the General Railway Signal Company for 130 miles automatic block signals, single track, between Cheney, Wash., and Pasco. The installation will consist of 263 upper quadrant signals, three-position, with electric approach lighting, and will cost approximately $445,000. When finished, this installation will complete the equipment of the main line of the Northern Pacific with automatic block signals from the Great Lakes to the Pacific Coast.

# Supply Trade News

**F. W. Stubbs,** mechanical engineer of the Chicago Great Western, has been appointed mechanical engineer of the **Standard Stoker Company,** with headquarters at Erie, Pa.

**The Combustion Engineering Corporation,** New York City, has acquired the Quinn Oil Burner & Torch Company also of New York City. **W. R. Quinn,** former president of the Quinn Company, becomes associated with the Combustion Engineering Corporation as manager of its fuel oil department.

**J. A. Hagar** has been appointed Chicago district sales manager for the **Columbus McKinnon Chain Company,** Columbus, Ohio. He will have charge of the sales of heavy and industrial chains in Illinois, Wisconsin, Minnesota, North Dakota and Nebraska. Mr. Hagar's headquarters are at 343 Dearborn street, Chicago.

An announcement has been issued that the **Safety Car Heating & Lighting Company** has acquired the business of the Stone Franklin Company, Inc., for the United States and Cuba, and will in the future be in a position to supply Stone Franklin equipments where required and the necessary spare parts for the maintenance of equipments now in service. **Samuel G. Allen,** vice-chairman of the Franklin Railway Supply Company was elected a member of the board of directors of the Safety Car Heating & Lighting Company on December 6, 1922.

### Decision in Locomotive Stoker Patent Suit

The United States Circuit Court of Appeals for the Third Circuit, at Philadelphia, on January 3, handed down a decision in the suit of the Locomotive Stoker Company vs. The Elvin Mechanical Stoker Company, which was brought in the United States District Court for the District of Delaware. Infringement was charged of the Gee and the Street patents for locomotive stokers, and Judge Morris, in the District Court, held that there was not infringement of the Gee patent, but that the Street patent was infringed. The Court of Appeals affirmed this decision as to the Gee patent, and reversed it as to the Street patent, holding that neither patent was infringed by The Elvin Mechanical Stoker Company and ordering the suit to be dismissed as to both patents.

## Obituary

**H. R. Curtis,** treasurer of the Melrose Park, Ill., works of the National Malleable Castings Company, was instantly killed by an automobile in Chicago on January 2. He was born on December 23, 1867, at Marion, Ala., and began his business career in 1884, with the Thompson Smiths Sons, Duncan City, Sheboygan county, Mich. On February 8, 1888, he entered the employ of the Chicago Tire & Spring Company, and was appointed secretary in 1892, which position he held until 1894, when he was promoted to assistant manager. He held that position until 1896, on which date the Chicago Tire & Spring Company was acquired by the Latrobe Steel Company, and he was appointed cashier of the latter company, which position he held until 1908, when he was promoted to assistant to the president. When the Latrobe Steel Company was absorbed by the National Malleable Castings Company in 1909, he was appointed treasurer of the Melrose Park branch, which position he held until the time of his death.

H. R. Curtis

**W. C. Nixon,** vice-president of the Western Tie & Timber Company, St. Louis, Mo., and also secretary of the National Association of Railroad Tie Producers and editor of the Cross Tie Bulletin, died at St. Louis on January 1, as a result of a nervous breakdown. He was born at Jacksonville, Ill., on February 17, 1886. In July, 1903, he was appointed to the United States Naval Academy at Annapolis, from which he graduated on September 12, 1906, having completed the course in one year less than the required time. Following his graduation he engaged in active service of the United States Navy as Ensign on the United States gunboats Kentucky and Pingey. He received a lieutenancy in 1911 and in the spring of 1912 resigned to become vice-president of the Western Tie & Timber Company, which position he held actively until January 24, 1917. On the later date he re-entered the navy and was assigned to active duty as executive officer of the U. S. S. Wainwright, which served in Admiral Sims' fleet during the entire period of the war. In the fall of 1918 he was promoted to lieutenant-commander of the U. S. S. Patterson. Later he was commissioned commander in Class 1 of the United States Naval Reserve Corps, and returned to St. Louis to resume his duties as vice-president of the Western Tie & Timber Company, which position he held until the time of his death.

W. C. Nixon

**Robert Enos Adreon,** president of the American Brake Company and acting southwest district manager of the Westinghouse Air Brake Company, died suddenly of apoplexy on January 6, in a St. Louis, Mo., theater. Mr. Adreon was well known in the railway supply field and had a wide acquaintance among railroad men. He was born on November 1, 1876, at St. Louis, and was a son of the late E. L. Adreon, who also was president of the American Brake Company at the time of his death some years ago. After attending the public schools of St. Louis and Smith Academy, Mr. Adreon entered Purdue University, being graduated in 1902 with the degree of mechanical engineer. His first position was that of chief draughtsman with the Imperial Electric Light & Power Company of St. Louis. In 1903 he joined the Westinghouse Automatic Air & Steam Coupler Company, of which he subsequently became vice-president and general manager. In 1908 he resigned to enter the employ of Westinghouse, Church, Kerr & Company, contracting engineers. He was appointed assistant general manager of the American Brake Company in 1911, later becoming general manager, then vice-president and general manager, and on April 10, 1919, he was elected president and general manager. Mr. Adreon was

R. E. Adreon

active in a number of other industrial, mechanical, social and civic organizations. He was a director of the National Brake & Electric Company of Milwaukee, the Safety Car Devices of St. Louis, and the St. Louis Chamber of Commerce.

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**William T. Lane,** has been appointed western sales manager of the **Franklin Railway Supply Company, Inc.,** New York. Mr. Lane's headquarters will be at Chicago, with J. L. Randolph, vice-president in charge of western territory. Mr. Lane has spent his entire business career in the railway supply field. On leaving college he entered the employ of the Franklin Portable Crane & Hoist Company as an apprentice. He then served as draftsman with the Franklin Railway Supply Company, Inc., later becoming chief draftsman. In 1915 he was made mechanical engineer, and in 1919 district sales manager at San Francisco. In 1921 Mr. Lane was transferred from San Francisco to Cleveland as district manager, central territory, which position he held at the time of his recent appointment.

## Railway Construction

CANADIAN NATIONAL.—This company, which was reported in the *Railway Age* of December 23, page 1213, as having authorized the construction of a cut-off from Longlac, Ont., on the Canadian Northern to Nakina, on the National Transcontinental, a distance of approximately 29.1 miles, has awarded the contract for the work to Foley Brothers & Hervey of Toronto, Ont.

CHICAGO & NORTH WESTERN.—This company has awarded a contract to John Marsch, Chicago, for extensions to passing tracks on the Black Hills and Wyoming divisions, including an extension of the yard at Casper, Wyo.

CHICAGO, ROCK ISLAND & PACIFIC.—This company, which closed bids on December 8, 1922, for the construction of a brick and stone passenger station at Clay Center, Kan., is now revising the plans which were made and will call for new bids in the near future.

DETROIT & MACKINAC.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction and operation of an extension from Alpena to Rockport, Mich., 12.1 miles.

FT. WORTH & DENVER CITY.—This company closed bids on January 9 for the construction of washroom facilities at Childress, Tex., to cost approximately $10,000.

ILLINOIS CENTRAL.—This company, which was reported in the *Railway Age* of December 2 as planning the construction of an extension to its passenger station at New Orleans, La., has awarded the contract for this work to the Gulf Construction Company, New Orleans, La.

MISSOURI PACIFIC.—This company, reported in the *Railway Age* of January 6, as planning the construction of an addition to the passenger station at Council Grove, Kan., has awarded the contract to A. F. Morris, Kansas City, Mo.

MISSOURI PACIFIC.—This company, jointly with the city of St. Louis and the Terminal Association of St. Louis, will construct a reinforced concrete viaduct at Fourteenth street, St. Louis, Mo., which will cross the tracks of the Missouri Pacific and the Terminal Association. The construction is in charge of L. R. Bowen, chief engineer, bridges and building, city of St. Louis.

NEW YORK CENTRAL.—This company contemplates the construction of a subway south of Toledo, Ohio, to eliminate a grade crossing.

PHILADELPHIA & READING.—This company has awarded a contract to the Robert E. Lamb Company, Philadelphia, for the construction of an oil storage house at Reading, Pa., to house the company's entire oil supply. The building will be built of brick and concrete, will have 44 storage tanks and will be 75 ft. by 150 ft., with a platform the same size.

ST. LOUIS-SAN FRANCISCO.—This company contemplates the construction of a brick freight and passenger station at Springdale, Ark.

## Railway Financial News

BALTIMORE, CHESAPEAKE & ATLANTIC.—*Foreclosure Sale Expected.*—See Maryland, Delaware & Virginia.

BALTIMORE & OHIO.—*Bonds Off Legal List.*—All bond issues of the Baltimore & Ohio and the Chicago, Milwaukee & St. Paul railroads are off the list of bonds legal for investment by saving banks in New York state. This is due to inability of either to resume dividends of at least 4 per cent on their stock. In addition to other requirements, the law provides that a road for five successive years previous must have paid dividends of at least 4 per cent on all its outstanding capital stock. The period of federal control and two years thereafter were excluded in this calculation. The ruling of the attorney general of New York state made the B. & O. and St. Paul issues legal for the whole of 1922. Savings bank officials have long since ceased buying issues whose status was dubious.

CENTRAL OF GEORGIA.—*Six Months' Guaranty Certified.*—The Interstate Commerce Commission has certified the amount of this company's guaranty for the six months' period of 1920 as $3,923,924, of which the balance due was $298,924.

CHESAPEAKE & OHIO.—*Stock Acquired.*—See article on another page of this issue entitled "Van Sweringen Interests Acquire C. & O. Stock."

CHICAGO & WESTERN INDIANA.—*Application to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $236,000,000 of 4 per cent consolidated mortgage bonds.

CHICAGO GREAT WESTERN.—*Bonds of Controlled Road.*—See Mason City & Fort Dodge.

DENVER & RIO GRANDE WESTERN.—*Receivers' Certificates Authorized.*—The Interstate Commerce Commission has authorized an issue of $5,000,000 of receivers' certificates to be sold at not less than 98.

DENVER & RIO GRANDE WESTERN.—*Reorganization.*—A reorganization plan is reported in progress under which this road would be operated as an independent property under the joint ownership of the Missouri Pacific and the Western Pacific.

ILLINOIS CENTRAL.—*Authorized to Build New Line and Purchase Kentucky Midland.*—The Interstate Commerce Commission has issued a certificate authorizing the Chicago, St. Louis & New Orleans to construct a new line between Dawson Springs and Central City, Ky., and as incidental thereto and constituting part of the proposed new line, to acquire by purchase a line of the Kentucky Midland extending from Central City, 9.11 miles. It is proposed to extend this to a point on the partially completed Dawson-Providence branch about 4 miles north of Dawson Springs, a distance of 25.2 miles, and to complete the Dawson-Providence branch between the point of connection and Dawson Springs, thus forming a second line from Dawson Springs to Central City. The commission also approved the proposed acquisition by the Illinois Central of control of the new line by lease.

ILLINOIS TERMINAL RAILROAD.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $3,200,000 of preferred stock and $500,000 of common stock to be used in acquiring the property of the Illinois Terminal Company in connection with a reorganization.

INDIANAPOLIS UNION.—*Asks Authority to Issue Bonds.*—This company and the Pittsburgh, Cincinnati, Chicago & St. Louis and the Cleveland, Cincinnati, Chicago & St. Louis have applied to the Interstate Commerce Commission for an order authorizing the Indianapolis Union to issue $4,000,000 of general and refunding mortgages 5 per cent gold bonds, the proceeds to be used to pay some three-year notes maturing on February 1 and to be guaranteed by the other companies.

INTERNATIONAL-GREAT NORTHERN.—*Bonds Sold.*—Speyer & Co. and J. & W. Seligman & Co. have notified members of the reorganization syndicate that they have sold all of the $13,461,500 first mortgage 30-year 6 per cent bonds and all the adjustment mortgage 6 per cent bonds heretofore held by the syndicate.

*Acquisition by St. L.-S. F.*—See St. Louis-San Francisco.

MARYLAND, DELAWARE & VIRGINIA.—*Foreclosure Proceedings Expected.*—The Maryland, Delaware & Virginia and the Baltimore, Chesapeake & Atlantic, subsidiaries of the Pennsylvania, are to be sold under foreclosure proceedings shortly. It is likely the roads will be purchased by the Pennsylvania. Both companies operate steamship lines on the Chesapeake Bay and two railroads in Maryland and Delaware.

MINNEAPOLIS & ST. LOUIS.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue not exceeding $10,000,000 of 7 per cent non-cumulative preferred stock and not exceeding $8,985,000 of supplemental mortgage 6 per cent bonds to be exchanged for outstanding refunding and extension mortgage 5 per cent bonds to the amount of $8,985,000.

MISSISSIPPI EXPORT RAILROAD.—*Authorized to Operate Line.*—The Interstate Commerce Commission has issued a certificate authorizing this company to operate a line of railroad from Pascagoula to Evanston, Miss., the southerly portion of the railroad formerly operated by the Alabama & Mississippi.

NEW YORK CENTRAL.—*New Director.*—James B. Forgan, president of the Union Trust Company of Chicago, has been elected a director, succeeding William Rockefeller, deceased.

NORTHERN PACIFIC.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $14,756,500 of refunding and improvement mortgage 5 per cent bonds maturing July 1, 2047, to be sold to reimburse the treasury for expenditures in retirement of a previous issue of refunding and improvement mortgage bonds in order to provide the company with working capital.

NORFOLK & WESTERN.—*Equipment Trusts Sold.*—This company has sold $6,030,000 4½ per cent equipment trust certificates of 1922 to Edward B. Smith & Co., Elkins, Morris & Co., Janney & Co., and the Girard Trust Company of Philadelphia.

PENNSYLVANIA.—*Foreclosure Sale of Subsidiaries.*—See Maryland, Delaware & Virginia.

PENNSYLVANIA.—*Subsidiaries May Be Sold.*—See Maryland, Delaware & Virginia.

PERE MARQUETTE.—*Dividends.*—The directors have declared an extra dividend of 2 per cent on the 5 per cent preferred stock, thereby clearing up all payments in arrears on that issue. The usual quarterly dividends of 1¼ per cent also have been declared on both the prior preference and preferred stocks. All the disbursements are payable February 1 to stock of record January 15.

PERE MARQUETTE.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue and sell or pledge $12,826,000 of first mortgage, 5 per cent gold bonds, of which the company had previously been authorized to issue $3,231,000. Of the proceeds, $6,725,000 is to be used for additions and betterments and $2,870,000 to retire collateral trust bonds.

RUTLAND.—*New Directors.*—George F. Baker and Edward Milligan have been elected directors to succeed William Rockefeller and T. DeWitt Cuyler, respectively.

ST. LOUIS, EL RENO & WESTERN.—*Asks Authority to Abandon Line.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line from Guthrie to El Reno, Okla., 42.2 miles.

ST. LOUIS-SAN FRANCISCO.—*Asks Authority to Acquire Control.*—This company has filed with the Interstate Commerce Commission its application for authority to acquire control of the International-Great Northern by the purchase of 75,000 shares of its common stock at $27.25 a share.

Formal protest against the proposed merger has been forwarded to the Interstate Commerce Commission by Attorney General W. A. Keeling acting on behalf of the state of Texas. The protest is based on the ground that the consolidation of the two properties would be in violation of the constitution of the state. After citing the constitutional provision which is involved in the proposed merger, the protest says:

> The state here protests against any certificate of convenience and necessity being issued which is in violation of its laws, and respectfully submits that any order of the Interstate Commerce Commission granting such a certificate of convenience and necessity as prayed for by the St. Louis-San Francisco would not bind the state of Texas.
>
> The state of Texas prays that if the Interstate Commerce Commission should grant its certificate, that the present or future convenience and necessity require that applicant, St. Louis-San Francisco Railway Company, a Missouri corporation, acquire the capital stock of the International-Great Northern Railroad Company, that said order authorizing such acquisition be so conditioned as not to create a consolidation of the Texas corporation with the applicant, a Missouri corporation, in violation of the constitution and laws of the state of Texas.

*Stockholders' Special Meeting.*—A special meeting of the stockholders has been called for February 21, in St. Louis, to consider and act upon the acquisition of the International-Great Northern.

TEXAS & PACIFIC.—*Bill Authorizes Increased Capital Stock.*—The Senate on January 8 passed a bill introduced by Senator Sheppard to authorize the Texas & Pacific, which was incorporated under a federal charter, to increase its capital stock from $50,000,000, the amount previously fixed in accordance with the provisions of the federal charter act, from time to time as it may be authorized by the Interstate Commerce Commission on application, but not to exceed in the aggregate $75,000,000. Senator Sheppard said that since the road was organized under a federal charter and the charter limited the security issues to certain figures, the company could not without the additional authority issue new securities even with the approval of the Interstate Commerce Commission.

TOLEDO, ST. LOUIS & WESTERN.—*Dividends Declared.*—This company has declared a dividend of $4 on the common and $4 on the preferred stock, both payable February 20 to stock of record January 30.

The preferred stock is 4 per cent non-cumulative, and the last payment was 1 per cent, on October 16, 1911. No dividends have ever been paid on the common. The control of the road was obtained in March, 1922, by the Van Sweringen interests in Cleveland.

## Tentative Valuations

The Interstate Commerce Commission has issued tentative valuations in which it finds the final value of the property owned and used as of the valuation date as follows:

Blytheville, Burdette & Mississippi River, 1916, owned, $115,154; used, $120,480.
Canadian Pacific Lines in Maine and Vermont, 1916, owned, $759,500; used, $7,069,079.
Joliet Union Depot, 1916, owned $391,270.
Natchez, Columbia & Mobile, 1916, owned $374,436; used, $454,436.
Wisconsin & Michigan, 1916, owned $2,208,636; used, $2,209,333.

## Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out and received from the several roads the following amounts:

| | |
|---|---|
| Lake Erie & Eastern paid Director General | $110,000.00 |
| Dayton Union paid Director General | 11,500.00 |
| **Short Lines** | |
| Sterling Mountain | $ 3,750.00 |
| Wisconsin & Michigan | 35,000.00 |

## Dividends Declared

Nashville, Chattanooga & St. Louis.—3½ per cent, semi-annually, payable February 1 to holders of record January 20.
Pere Marquette.—Preferred, 1¼ per cent, quarterly; 2 per cent, account of accumulated dividends; both payable February 1 to holders of record January 15.
Reading Company.—Preferred, 1 per cent, quarterly, payable March 8 to holders of record February 16.
Toledo, St. Louis & Western.—Common and preferred, 4 per cent, both payable February 20 to holders of record January 30.

## Trend of Railway Stock and Bond Prices

| | Jan. 9 | Last Week | Last Year |
|---|---|---|---|
| Average price of 20 representative railway stocks | 64.35 | 65.38 | 55.09 |
| Average price of 20 representative railway bonds | 85.56 | 85.58 | 76.49 |

# Railway Officers

## Executive

**William L. Campbell,** vice-president of the New York, Susquehanna & Western, has been appointed assistant to the vice-president in charge of operation of the Erie with headquarters at New York.

## Financial, Legal and Accounting

**John K. Thompson** has been appointed assistant controller of the Erie.

**J. H. Pierson,** assistant auditor of freight accounts of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, O., has been promoted to auditor of freight accounts with the same headquarters, succeeding E. E. Kruthoffer. **J. B. Goeke** has been appointed assistant auditor of freight accounts, succeeding Mr. Pierson.

## Operating

**S. O. Hoge** has been appointed general manager of the Buffalo, Union-Carolina.

**H. H. Tisdale** has been appointed trainmaster of the Coast Lines of the Atchison, Topeka & Santa Fe, with headquarters at Needles, Cal.

**L. D. Kenney** has been appointed assistant superintendent of transportation of the Delaware & Hudson with headquarters at Albany, N. Y.

**A. Edmonds** has been appointed supervising agent of the operating department of the Michigan Central, with headquarters in the general superintendent's office at Detroit, Mich.

**J. E. Roberts,** superintendent of transportation of the Delaware & Hudson, has been temporarily relieved of his duties and is to act as chairman of the American Railway Association Committee to confer with the United States Coal Commission. His office will be at Washington, D. C.

**E. I. Ford,** formerly general superintendent of terminals of the Chesapeake & Ohio at Newport News, Va., has been appointed general agent of the operating department of the same company, with headquarters at Cincinnati, Ohio, with supervision over deliveries and receipts from connecting lines. Since he left the service of the Chesapeake & Ohio in 1920, Mr. Ford has been connected with a coal company serving in the capacity of vice-president.

## Mechanical

**A. L. Moler** has been appointed mechanical inspector of the Chesapeake & Ohio reporting directly to the chief mechanical officer.

**A. R. Numbers** has been appointed road foreman of engines of the Eastern division of the Atchison, Topeka & Santa Fe, with headquarters at Ottawa, Kan.

**J. J. Mellen** has been appointed master mechanic of the Cincinnati Northern, with headquarters at Van Wert, Ohio, succeeding W. R. Beck, who has resigned.

**R. W. Retterer,** acting mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, has been appointed mechanical engineer with the same headquarters.

**George H. Rusbuldt,** valuation engineer of the mechanical department of the Chicago Great Western with headquarters at Oelwein, Ia., has been appointed mechanical engineer, succeeding F. W. Stubbs, resigned.

## Engineering, Maintenance of Way and Signaling

**C. W. Johns,** engineer of construction of the Chesapeake & Ohio, has been appointed chief engineer with headquarters at Richmond, Va., effective January 1.

**T. B. Ballantyne** has been appointed division engineer of the Farnham division of the Canadian Pacific succeeding **M. Kelly,** who has been transferred to a similar position at Toronto Terminal.

**Hugh A. Marshall,** chemist for the Missouri Pacific, has resigned to become chief chemist in the water supply department of the Chesapeake & Ohio with headquarters at Huntington, W. Va.

**T. C. Hanson,** supervisor of signals on Northern Pacific lines east of Mandan, N. D., with headquarters at St. Paul, Minn., has been transferred to Tacoma, Wash., with supervision over the lines west of Paradise, Mont., succeeding E. A. Cuthbertson, deceased. **F. L. Eukes** has been appointed supervisor of signals, lines east of Mandan, with headquarters at St. Paul, Minn., succeeding Mr. Hanson.

**J. W. Kern, Jr.,** road master of the Illinois Central with headquarters at Carbondale, Ill., has been promoted to district engineer with headquarters at New Orleans, succeeding E. L. Crugar. **L. H. Bond,** district engineer with headquarters at Chicago, has been promoted to assistant engineer maintenance of way with the same headquarters, succeeding **W. G. Arn,** who was promoted to assistant chief engineer of the Chicago terminal improvement in November. **M. M. Backus,** district engineer with headquarters at Waterloo, Iowa, has been transferred to Chicago, succeeding Mr. Bond.

**E. L. Crugar,** district engineer on the Illinois Central, with headquarters at New Orleans, La., has been promoted to engineer of construction, with headquarters at Chicago, Ill. Mr. Crugar was born on November 4, 1879, at Saline City, Mo. He attended Pritchett College in 1900 and the University of Wisconsin in 1901 and 1902. He entered railway service in June, 1900, while on a vacation from college, as a chainman on the Chicago & Alton and during later vacations served as a rodman and masonry inspector for the same company. He was appointed chief clerk to the chief engineer of the Knoxville, La Follette & Jellico, which is now a part of the Louisville & Nashville, in April, 1902, and within the next four years was promoted to resident engineer and assistant engineer at the same place. He returned to the service of the Chicago & Alton in March, 1906, as chief clerk to the chief engineer and two years later was appointed assistant engineer in charge of construction. He held this position for two years and was again promoted to assistant chief engineer, with headquarters at Chicago. He entered the service of the Illinois Central in April, 1914, as assistant engineer and on December, 1915, was promoted to district engineer, with headquarters at New Orleans, La., which position he held at the time of his recent appointment as engineer of construction, with headquarters at Chicago.

## Purchasing and Stores

**H. C. Stevens** has been appointed general storekeeper of the Wabash, succeeding R. F. Augsburger, who has resigned.

## Special

**W. G. Slaughter,** acting chief special agent in the office of the vice-president and general manager of the Seaboard Air Line, has been appointed chief special agent.

**F. W. Mitchell** has been appointed director of personnel of the New York, New Haven & Hartford, which position he will assume in addition to that of supervisor of safety, which he now holds.

**J. M. Prickett** has been appointed superintendent of personnel of the Kansas City Southern and the Texarkana & Ft. Smith with headquarters at Kansas City, Mo. He will have jurisdiction for the general manager over employment, rates of pay and working conditions in all branches of the company's service.